

CHANGES IN DIETARY BEHAVIORS OF GREEKS AND  
GREEK-AMERICANS LIVING IN TARPON SPRINGS, FLORIDA

By

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### List of Abbreviations

BMI = body mass index  
BP = blood pressure  
CA = cancer  
Ca/Phos = calcium to phosphorus ratio  
Card = cardiac (heart) medication  
CHD = carbohydrate  
chol = cholesterol  
CSI = cholesterol-saturated fat index  
Cult = culture  
Diab = diabetes  
GA = Greek-American  
GR = Greek  
gms = grams  
HBP = high blood pressure medication  
HDL = high density lipoprotein  
ht = height  
K = potassium  
kg = kilograms  
kcal = Calories  
LDL = low density lipoprotein  
MANOVA = multi-variate analysis of variance  
max-EPA = maximum-ecosapentanoic acid  
mg = milligram  
mg/dl = milligrams per deciliter (cholesterol values)  
mm = millimeters (of mercury; blood pressure reading)  
N = number  
Na = sodium  
Natl = national  
NG = non-Greek  
NHANES = National Health and Examination Survey  
pk = cigarette pack  
Pro = protein  
PUFA = polyunsaturated fatty acid  
Reli = religion  
RNA/DNA = ribonucleic acid / deoxyribonucleic acid  
SAS = Statistical Analysis Systems  
SES = socioeconomic status  
SFA = saturated fatty acids  
TV = television  
U.S. = United States  
USDA = United States Department of Agriculture  
wk = week  
wt = weight  
x = mean



Abstract of Dissertation Presented to the Graduate School  
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CHANGES IN DIETARY BEHAVIORS OF GREEKS AND  
GREEK-AMERICANS LIVING IN TARPON SPRINGS, FLORIDA

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A cultural ecological model was used to analyze infrastructural, structural and demographic factors that influence dietary behaviors and subsequent coronary heart disease (CHD) risk status of Greek immigrants, 25-74 years, in the United States. Greeks were chosen because they provide a natural experiment of persons who migrated from a country with a low to a high mortality rate for CHD. As the diet becomes more "Americanized," previous studies showed that the risk of CHD increased among Greek immigrants.

Subjects were recruited at a community-wide cholesterol screening, a health fair, a Greek church and Greek organizations during the Fall of 1988 and Spring 1989. Twenty-two Greeks, 44 Greek-Americans and 65 non-Greeks participated by completing the study questionnaire, were

weighed and measured, had blood pressures checked and had a finger stick for blood that was analyzed for cholesterol. The self-administered questionnaire elicited demographic and CHD risk factor information, ethnic attitudes, restaurant and cooking preferences, a food frequency and 24-hour recall.

Results indicated that Greek-Americans had significantly lower ( $p$ =less than .05) cholesterol values ( $\bar{X}$ =205 mg/dl) than non-Greeks ( $\bar{X}$ =220 mg/dl). Age had a positive relationship ( $p$ =.04) with blood cholesterol for the Greeks and non-Greeks.

Structural factors that were operationalized to measure commercial influences, e.g., purchasing foods and drinks advertised on TV, using newspaper coupons for food purchases and using recipes from popular magazines were strong predictors ( $p$ =.024) of increasing cholesterol values for the Greeks. Non-Greek cholesterol values were not significantly influenced by infrastructural and structural factors. A sedentary lifestyle was predictive of higher ( $R$ -square=.10,  $p$ =.0007) cholesterol among the non-Greeks and the absence of a chronic disease diagnosis was predictive of low ( $R$ -square=.11,  $p$ =.0017) cholesterol levels.

Nutrition educators would benefit from considering the varying infrastructural and structural influences on food behavior change. These factors could be incorporated into the development of intervention programs for various ethnic



populations who have increased their risk for CHD and other chronic diseases.

## CHAPTER 1

### INTRODUCTION

#### Diet and Heart Disease

Since the mid-1960s, epidemiological evidence has accumulated, pointing to dietary behaviors as one of the explanatory variables in the increased risk of coronary heart disease (CHD). In 1980 and 1985, the United States government published dietary goals recommending reduced intakes of fat (especially saturated fat), sugar, and salt, with increased intakes of complex carbohydrates and fiber to protect against CHD risk. In 1988, the Surgeon General's Report on Nutrition and Health (DHHS 1988) summarized the research on the role of diet in health promotion and disease prevention. For the two out of three adult Americans who do not smoke or drink excessively, the choice of what to eat seems to influence long-term health prospects more than any other behavior. The relationship of dietary fat and cholesterol to CHD is supported by clinical, epidemiological, metabolic, and animal evidence. These studies strongly indicate that the formation of atherosclerotic lesions in coronary arteries, which contribute to the risk of CHD, is increased in proportion to levels of total and low density lipoprotein (LDL) cholesterol in blood. Total

and LDL cholesterol, in turn, are increased by diets high in total and saturated fat but decreased by diets containing polyunsaturated and/or monounsaturated fat.

I chose to systematically describe changes in dietary behaviors among Greek immigrants and Greek-Americans living in Tarpon Springs, Florida, for this study because the population in Greece has a low-risk for CHD. The age-standardized death rate for CHD is 229.8 per 100,000 in the United States and 85.1 per 100,000 in Greece (WHO 1986). Keys (1980) found the CHD mortality rate of a United States male cohort 40-59 years to be 5.69 times higher than that of a matched Greek cohort. Greek immigrants to the United States are adopting traditional American dietary practices, thus increasing their CHD risk status (Christakis et al. 1981).

Preservation of the traditional diet has been identified with lowered risk of coronary heart disease for Greek-Americans (Christakis et al. 1965 and Keys 1980) and for other ethnic-Americans, e.g., Japanese (Robertson et al. 1977). However, there are few systematic studies of the natural dietary changes which occur among individuals in response to situational, economic, technological, and media influences.

### Ethnicity

Immigrants are faced with an unfamiliar diversity of food which alters food choices and levels of consumption.

Acculturation and assimilation into an industrialized host society that promotes consumption of mass-produced foods alters specific dietary components, life styles, and related health practices. The multiple forces that work to hold consumption in channels predictable enough to maintain food-industry profits paradoxically narrow human choice and the opportunity to resist the trend in the guise of increasing convenience, ease, and "freedom" (Mintz 1985:211). Acculturation research provides a means for observing how immigrants, when confronted with altered food consumption environments, utilize adaptive strategies to cope with the new conditions. In the process of adaptation, new food behaviors and concepts about food emerge (Bennett 1976). Identification with ethnic origins by individuals who place a high importance on ethnic cohesiveness and dietary practices may be advantageous in the maintenance and adoption of health promoting food behaviors.

Ethnicity and other factors lead to intracultural variation in human food patterns and nutritional status within populations with ostensibly similar sociocultural environments. The key to understanding diet and nutritional status in an ethnic community is to delimit dietary heterogeneity and address the alternative ways in which individuals, families, and groups procure food, and decide among the multiple food choices and food use patterns.

Dietary differences in this study were not treated as random and idiosyncratic phenomena, but rather as characteristics of broad patterns of food use which Bennett (1976) terms "instrumental behavior." Bennett's framework for a cultural ecological analysis incorporates three domains: 1) thought, the mental rules of thinking that develop via the process of experience and thinking about experience, e.g., attitudes, values, logic and structures; 2) interhuman activity, the observed individual and group rules of behavior that govern relationships, e.g., interaction, consensus, conflict, affiliation, individualism, and reciprocity; 3), adaptation, the patterns and rules of individual and group social adjustment and behavioral change in the course of realizing goals or maintaining status quo, e.g., coping, adjustment, adaptation, adaptive strategies, achievement, compromise and fulfillment. The distinction between interhuman activity, and adaptation, is analytic. Interhuman activity is primarily descriptive while adaptation is explanatory. Adaptive behavior further divides into two levels of analysis: a). microsocial, which views behavior in specific contexts of purpose, e.g., innovative, manipulative, coping, characterized by both a formal, or manifest, and informal, or latent, level of operation, depending on the sanctioned values of the group; and b). macrosocial, the meaning of specific behaviors to the larger



social system or institution. Pareto (1916) referred to a culture's manifest level as "residues" that included artifacts, language, stories, rites, rituals and ceremonies. He called the latent level of operation, "derivations" or the hidden code (or concepts) behind statements.

A cultural ecological framework was used to identify underlying conditions and factors which were adaptive or maladaptive dietary behaviors in terms of health consequences. Dietary behaviors in this study were viewed as the result of a conscious or unconscious decision-making process within a specific context which offered alternatives and imposed constraints on choice. A feedback system further supported or modified this decision process (Bennett 1976).

In this research, I addressed the diet-health status of Greek immigrants and Greek-Americans (especially in relation to CHD risk) stemming from dietary changes that accompany assimilation into the American society. The direction and extent of an immigrant's assimilation, to a large extent, is believed to result from forces of attraction (positive and negative) generated by the social organization of ethnic communities and their capacity to attract and hold members within their social boundaries (Breton 1964).

Moskos (1989) distinguishes between acculturation and assimilation in describing Greek-Americans. He views acculturation as the acquisition by the immigrants and their

descendants of the cultural behavior--language, norms, customs--of the new society. Assimilation, in his definition, implies the entrance of the ethnics into the very fabric--social cliques, business life, civic associations, and, eventually, the families--of the society. While acculturation usually proceeds faster than assimilation, he believes that acculturation has probably lagged behind in the Greek-American population. If his assumption is true, then dietary practices of Greek-Americans in Tarpon Springs have changed more slowly than their macrosocial adaptation to the American social, business and civic institutions.

#### Research Goals

The key goals in this study are a) a description of dietary patterns determined by a complex set of variables emphasizing inter-ethnic and intra-ethnic heterogeneity and a cultural ecological framework that stresses the importance of the social as well as the material environment; and b) a delineation of variations in diet as adaptive strategies among Greeks, Greek-Americans and non-Greeks. (Figure 1, page 7), (DeWalt 1983, DeWalt and Pelto 1976, Goode et al. 1984).

A related objective is to emphasize the multifactorial nature of risk factors that affect the development of CHD. Diet is examined within this context as one of the indirect

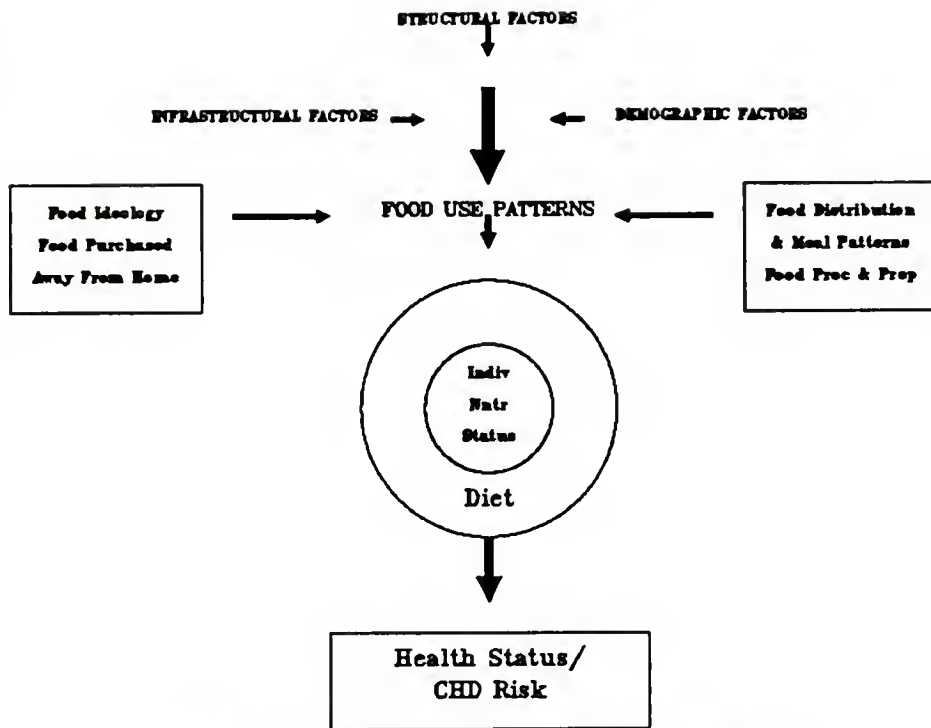


Figure 1-1: Ecological Influences on Food and Diet-Related Disease

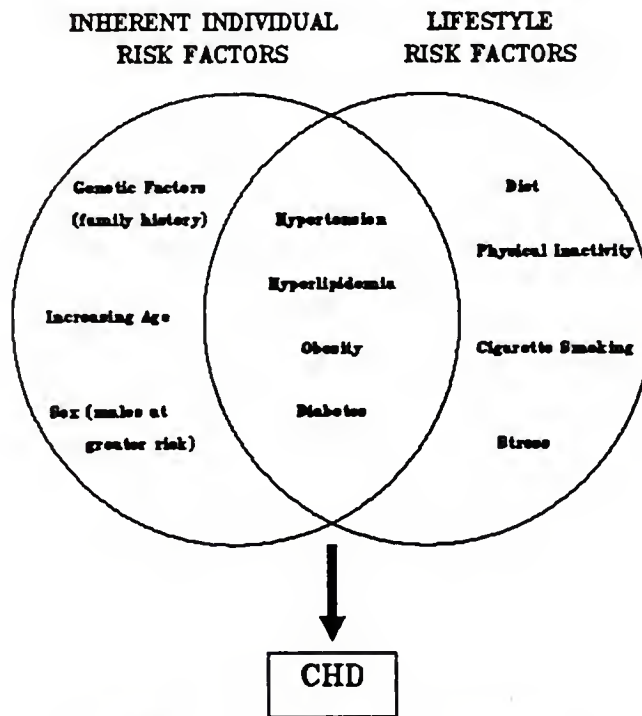


Figure 1-2: Health Status/ CHD Risk

life style factors that may make the occurrence of CHD more probable (Figure 2, page 7), (Beaton, 1976).

Dietary patterns and other CHD risk factors are analyzed to identify interactions between ethnic and technological influences. These observed patterns are indicative of adaptive or maladaptive behaviors that affect CHD risk factor status. The observed systematic trends in dietary pattern changes among aggregates of Greek and Greek-American individuals, compared to non-Greeks, are useful in predicting future dietary changes. Such predictions could serve as a marketing tool for designing a nutrition intervention program for Greeks and Greek-Americans, who are at increased risk for CHD, by identifying characteristics of persons who are most amenable to incorporating directed dietary changes into their food behaviors. Health planners may find this study useful when developing guidelines for health-related behavior changes that deal with a complexity of food consumption behaviors among ethnic populations that have also increased their risk for CHD and other chronic diseases.

## CHAPTER 2

### REVIEW OF THE LITERATURE

American anthropologists in the first half of the twentieth century viewed culture as an ideational, superorganic construct. They were less concerned with material technical culture and focused more on values, social structure, and ideational data (Bernard and Peltó 1987).

Humans were thought to have distinctive idea systems and cultural definitions of things like food which influenced their behaviors. Behavioral differences among distinct social groups and communities were believed to result from differences in culturally-based idea systems. Extension of this notion of cultural causality was the conclusion (which became an assumption in our culture) that in order to change behavior, including food consumption behavior, culture (that is, ways of thinking about things like food) had to change. Mead (1955) supported this educational model of behavioral change, and this model continues to be supported among nutrition educators today (Peltó 1981).

During the 1960s and 1970s, ecological theorists in anthropology reconsidered the materialistic and



technological influences on human behavior. Harris (1979) for example, described his view of how ideational and material variables interact to influence human behavior. In contrast to the idealist approach which defines social and cultural phenomena from an in-group (emic) perspective, Harris focuses on access to resources, biological determinants, and technological, and energy factors as causal influences on both human behavior and culture.

Bernard and Peltó (1987), in the book Technology and Social Change, collected essays which lent support to the technoenvironmental theory of how human lifeways are shaped. Anthropologists and other social scientists continue to describe the relationship of technological changes to changes in social relations, cultural values, attitudes, and psychological functioning.

This reorientation to culture change raises two important concerns: 1) What is the role of the individual in social change? and 2) Is technology necessarily "good for" people (Bernard and Peltó 1987)?

Mintz (1985:13) recognized that the precise ways in which culture change occurs are not fully understood. He hypothesized that historical changes repeat or re-enact earlier recurrent sequences. Profound changes in dietary consumption patterns (e.g., use of sugar in the United Kingdom in the 18th and 19th century) were the consequences of non-random forces that created a world economy and shaped

relationships between separate cultures. Cultural "meaning", in his view, arises from cultural applications and uses. Thus, symbolic meaning emerges as a consequence of interacting external factors, e.g., economic, political and material, that give relevance or meaning to the symbol. In this context, observed behaviors are viewed as explanatory codes within an environmental milieu that can be read (decoded) as a "product of the production."

### Ethnicity

#### Definition

Ethnic studies prior to the 1970s focused on external observations of an ethnic group. Ethnic groups were seen as minority cultures that had temporary differences with the larger society. With time, the process of linear assimilation would be cumulatively completed (Newman 1978) and the ethnic group would be integrated into the host society. More recently, investigators have defined ethnic groups as liasoned individuals who share common cultural and social affiliations within a multicultural, multiethnic context (Cohen 1978). Ethnic group members determine inclusion and exclusion criteria for themselves and significant others. This broader definition of ethnicity suggests that ethnic groups can live in symbiotic adaptation with their environments without losing their unique cultural and social identities.

### Ethnicity and Culture

Harwood (1981) views ethnicity as a broader phenomenon than culture. While ethnicity is marked by certain cultural standards, the range of social situations and cultural expressions for the ethnic group is more varied. Ethnic groups are not limited to one culture context but interact in multiple alliances within their environments (Wolfe 1966). For example, Isajiw (1978) described a culture layer that is shared widely by numerous ethnic groups within Canadian society (this example could apply to the United States, as well). The technological culture is shared by many communities and individuals. There is a value placed on the products of technology, the people who have access to them and the use of new technologies. Technology's common language is spoken less as a symbol of identity than as a practical means of attaining the products of the technological culture. This culture layer either works together with other culture layers or it is contradictory and conflicts with the ethnic group's values. Ethnic group members determine whether to include or exclude it from their ranks.

### Criteria for Ethnic Membership

Ethnic membership criteria may be perceived differently by members than by non-members. To non-members, group adherence is marked by language use, endogamy, choice of friends, participation in religious functions or institutions, parochial schools and voluntary organizations

(Dreidger 1978). Discarding of these visible ethnic practices is referred to by Moskos (1989) as acculturation.

From an internal perspective, ethnic group members are aware of different coalitions and social ties among the membership. Social ties, such as friendships, marriages, and business relationships do not form via a single focus of alliance with fellow members, but incorporate multiple dimensions of interaction with individuals from inside and outside the ethnic boundary (Wolfe 1966). Breton (1978:61) described these ethnic ties as partially overlapping or "intersecting circles" to which individuals belong. One circle may include kinship and friendship ties and another circle may represent occupational, religious and political affiliations. A small number of group members may share liaisons in both circles, but the majority of members share these ties with either different fellow ethnics or with individuals from outside the ethnic group. Moskos (1989) describes the trend toward the establishment of social, business and political ties with individuals and organizations outside the ethnic group as assimilation into a host society. Acculturation usually precedes assimilation into a host society. For Greek immigrants, however, Moskos (1989) observed that assimilation generally has preceded acculturation into the United States society.



### The Ethnic Boundary

A major aspect of the ethnic group is the creation and maintenance of its boundary. Goode et al. (1984) described the boundary as permeable (open to outside influence) or closed (socially impenetrable). Within the boundary, members relate to significant objects and according to ascriptive behaviors. The social bond that is shared by its members provides a sense of peoplehood that is an antidote to the alienation experienced when immigrants arrive in a new culture. While local communities, families, clubs and unions offer membership ties, they do not provide the continuum of identity with an individual's cultural and social roots that the immigrant desires. The degree of boundary permeability determines the number of outside alliances the ethnic group will tolerate. For political and economic purposes, ethnic boundaries are often permeable. Moskos (1989) believes that motivation toward assimilation of Greeks into United States society is linked with a desire for economic ascendancy and political representation. Newman (1978) described relationships among ethnic members as subgroup segments with inter-group alliances, coalitions, and fluctuating assimilative and divergent relationships within the larger ethnic boundary. These ethnic segments utilize different ways to promote or resist assimilation and change (Van den Berghe 1969).



### Ways of Studying Ethnicity

Cohen (1978) suggested that situational ethnicity may be operationalized to represent the interaction of two or more people from separate groups in which labels are used to signify sociocultural differences between them. If the emergence and persistence of ethnic differences is believed to be non-random, then questions about factors which determine its qualities and variations can be examined.

Goode et al. (1984), utilized the concept of cultural ecological influences on intra-group diversity for studying persistence and change in an immigrant ethnic group's definition and food practices. They identified differences in the processes of boundary strengthening (social closure) and boundary permeability (open to outside influence), in relation to rules for food use among Italian-Americans in Philadelphia. They observed that contact with supermarkets, communication media, restaurants, school lunches, and industrial workplaces tended to decrease the importance of ethnic food usage and increased the importance of the American structure of meal formats (menus) and meal cycles (patterning of the use of different meal formats over time--day, week, week-end, annual holiday cycle and life cycle). Household differences in dietary behaviors were predictable from such variables as the composition of the household, an individual's stage in the domestic cycle, one's generational cohort, and activity patterns. An

indicator of ethnic continuity was household ranking of roles and the rights of members to negotiate menu selections. These decision-making actions were mediated by shared rules, situational pressures, and personal preferences.

#### Greek and Greek-American Ethnic Identity

Scourby (1979) observed that United States and foreign-born Greeks in New York City maintained strong religious and national ties, as observed in affiliations with the Greek Orthodox Church and social organizations which promoted dance, music and cuisine. In her study of three generations of Greek immigrants, she observed generational differences in internal perceptions of ethnic identity. Study respondents, when asked to identify themselves with ethnic labels, indicated weakening identities with being Greek. First generation Greeks tended to identify with Greek or Greek Orthodox labels. Second generation respondents thought of themselves as Greek-American, while a discernible trend to be called American was evident by the third generation respondents. The number of inconsistencies observed with individual ethnic identity underscored the notion that, from the perception of an ethnic member, much of ethnic identity is an unconscious and ambivalent experience. The individual reacts to positive and negative judgments that influence orientation toward or away from the ethnic group. Overall,

however, the majority of Greeks in New York City maintained relatively strong attachment ties to their ethnic religion and nationality, despite their identification with being American.

Moskos (1989:67) reported that the Greek Church in America serves both a religious and social function and is the "prime definer of Greek ethnicity in this country." He observed that the American generations of Greek-Americans are in many ways more Greek Orthodox than their middle-class Greek contemporaries in Greece. While these differences create social distances between Greek-Americans and newly arrived Greeks (Greeks who arrived in the United States within the past five years), there are shared similarities in their continuing conservative views about family and personal matters. While adapting where necessary in order to accommodate to the achievement standards of the larger society, the approximate one million Greek-Americans (Moskos 1989:2) have maintained a remarkable degree of communal and family cohesiveness.

The ethnic anchor for Greek immigrant families has been the promotion of the Greek language among their children (Moskos 1989). Greek-Americans, however, have been less concerned with promoting the Greek language and have concentrated more on instilling interest and pride in the Greek heritage and the Greek Orthodox faith. An appreciation of Greek heritage is fostered by a trip back to

Greece. An estimated majority of American-born Greeks have visited their ancestral homeland at least once.

Moskos (1989) identified three subgroups of Greeks in the United States: an older immigrant group who came to America before World War II or in the years immediately following; a more recent wave of immigrants who came to the United States since the lifting of the immigrant restrictions in 1966; and the children and grandchildren of Greek immigrant parents who constitute the Greek-American communities. While each of these groups claim varying degrees of allegiance to Greece, the majority (an estimated four out of five; Moskos 1989:67) share an ethnic commitment to a common Hellenic heritage and affiliation with the Greek Orthodox Church.

Ethnic ties among Greeks and Greek-Americans can be viewed as primary and secondary relationships. Primary ties are informal and intimate. They involve networks among individuals and families. Secondary ties describe more formal or casual relationships that deal, often bureaucratically, with segmented alliances. Among Greek-Americans, ethnic activities frequently involve segmented or secondary ties: church attendance, voluntary association membership, eating in Greek-cuisine restaurants, and episodic participation in social, cultural, and political gatherings. American-born Greeks may have strong primary ties with non-Greeks while simultaneously being



actively involved in the Greek-American community. Secondary group affiliation can define Greek ethnic identity as much as primary group affiliations. As generations become more removed (e.g., third and fourth generations) from the Greek homeland, Greek ethnicity is not so much a matter of cultural transmission, but one of voluntary participation in Greek-American institutional life. Greek culture among the two or more generations removed may be a new emergent brand of Hellenism in America. Yet, certain forms of Greek ethnic identity--a Greek Orthodoxy within the framework of American religious pluralism, attachments to old country foods and dances, ungrammatical Greek, the whole system of kinship life--continue.

#### The Greek and Greek-American Diet

Bread, olives, olive oil, fruits, nuts, and legumes are staples in the Greek diet. Vegetables are common and meats are used less frequently than in the American diet. Milk is rarely drunk but used instead in dairy products such as yogurt and feta cheese. Desserts are very sweet and are consumed as snacks or with lunch and dinner. Greek coffee is strong and laced with sugar. Religious and social occasions are marked by special, traditional food practices which include or exclude the serving of certain foods (Newman 1986 and Ashton-Vouyoucalos, 1975). Many foods are eliminated from the diet for special religious fasts. For example, the Easter season begins with a time of



masquerading and kite-flying known as apokria--the equivalent of the western carnival and "farewell to meat" (Nickles 1969). During the forty day Lenten fast, no red meat, chicken, fish, cheese, dairy products or eggs are eaten. Oil is eliminated during Holy Week, the week prior to the Orthodox Easter (personal communication 1982 and 1989).

Protein intake among Greeks appears to be adequate with no observed significant deficiencies. Mineral intakes for iron and calcium are below the United States Recommended Dietary Allowances both before and after immigration to the United States (Newman 1986).

Valassi (1962) studied food habits and food practices of Greek immigrants to the United States as compared to the habits and practices of non-migrants in their respective regions of origin in Greece. She also studied the food behavior of Greek-Americans as a group in the United States. Valassi observed differences between Greek immigrants and younger generation Greek-American food preferences. Meal composition of Greeks followed the traditional patterns and timing of meal practices in Greece. Greek-Americans conformed more to the meal patterns of Americans. American-born Greeks preferred less time-consuming recipes for food preparation. While they enjoyed special Greek dishes and desserts on special occasions and holidays,

Greek-Americans tended to "Americanize" the cooking methods, ingredients, and seasonings of Greek recipes.

Freedman and Grivetti (1984) observed similar trends among Greek-American women in Sacramento, California. They reported significant covariations among items such as respondent generation, composition of meals, and timing of food intake. They identified a strong trend of abandonment of traditional Greek dietary patterns and the adoption of American food practices by third generation Greek-Americans.

Moskos (1989) noted that food is of central importance among Greeks and Greek-Americans. Greek foods, e.g., lamb dishes, olive oil and vinegar salads, cheese pie, and a variety of Greek pastries, are used for social gestures of hospitality as well as nourishment.

A survey by Costantakos (1987) found that, even among third generation Greek-Americans, four out of five individuals still regard Greek food as being very much a part of their diet. Adaptation to the American diet involves compromises. For example, the traditional American Thanksgiving stuffed turkey will be found on the table beside a dish of feta cheese and kalamata olives.

Greek immigrants, however, have adopted the "American highball" in preference to ouzo or Greek whiskies (Moskos 1989:96). Unlike the Greek custom of drinking only with food, second and third generations of Greek-Americans are increasingly drinking "American style"--without food.

Thus, while some studies suggest that intra-group variations in dietary behaviors follow a linear acculturation model for Greek immigrants to the United States in which ethnic food patterns weaken with generations, this characteristic does not appear to be apparent for Greek immigrants in general. On the contrary, Goode et al. (1984) showed that situational and structural factors may influence individual behavior of Mediterranean immigrants to the United States, but may not weaken the shared sociocultural rules or break down the old system entirely. Interpreting intra-group variation and the structural factors that determine it can help to explain the cultural dynamic of both continuity and change in ethnic traditions. Viewed from this perspective, ethnic food systems are eating patterns which are socially mediated, transmitted, and reinforced. If an ethnic group remains relatively closed, then the structure of the food system continues to be transmitted and reinforced through social interactions and social sanctions.

#### Diet and Risk of CHD

Epidemiological studies (Christakis et al. 1981 and Kurtz et al. 1982) suggest that, as the Greek diet becomes more westernized, risk factor status for CHD increases among Greeks and Greek-Americans in the United States. Significant differences in risk factor status, e.g., increased serum LDL cholesterol, decreased high density

lipoprotein (HDL) cholesterol and increased triglycerides were observed in Greek-American boys aged 14-16 years as compared with Greek cohorts of the same age. Second generation Greek boys in the United States more nearly resembled the age-matched American boys' LDL and triglyceride patterns than did the serum profiles of Greek boys who immigrated to the United States with their families.

Ferro-Luzzi et al. (1984) demonstrated a similar increase in CHD risk factors with an experimental westernization of the Mediterranean diet in southern Italy. Experimentally increased dietary fat content, and altered saturated-to-polyunsaturated fat ratio, increased total serum cholesterol and LDL in both men and women, and reduced HDL values in women.

The Surgeon General's Report (1988) and the National Research Council's Report (1989) on diet and health found the association between dietary fat, especially saturated fat, and cholesterol with CHD to be highly supported by scientific evidence.

Grundy (1989) further elucidated this relationship by describing the effects of monounsaturated fatty acids on plasma lipids and lipoproteins. The "active" nutrient (Grundy 1989:530) when diets are high in monounsaturates, relative to saturated fats, may be the saturated fat. He believes that the monounsaturated fat's effect on



cholesterol-lowering may be "neutral." Its observed beneficial lowering effect of LDL cholesterol may be attributed to the low dietary saturated fat, since saturated fat has been shown in animal studies to suppress the receptor-mediated clearance of LDL.

Stearic acid, a saturated fat, does not raise total cholesterol or LDL (Bonanome and Grundy 1988). In contrast, palmitic acid (another saturated fat), which appears to be converted to oleic acid more slowly than stearic acid, raises LDL levels. While this observation may suggest that certain foods which are high in stearic acid (e.g., beef fat and cocoa butter) are acceptable for a cholesterol-lowering diet, most foods containing stearic acid also contain relatively large quantities of palmitic acid. Thus, foods containing saturated fats, in general, are reduced for a cholesterol-lowering effect (Grundy 1989).

Linoleic acid has been shown in previous equations (Keys et al. 1965 and Hegsted et al. 1965) to have a greater cholesterol-lowering effect than monounsaturates. High intakes of polyunsaturated fatty acids, however, will also reduce HDL cholesterol levels. HDL lowering, by contrast, was not observed with oleic acid diets (Mattson and Grundy 1985).

Dietary cholesterol has been shown, in animals, to suppress hepatic LDL receptor activity, decrease removal of LDL from the blood and thus, increase the concentration of



LDL cholesterol (Spady and Dietscky 1988). This action is similar to the effects of dietary saturated fats, as described by Grundy (1989). Decreasing the dietary cholesterol and saturated fats, therefore, increases the LDL receptor activity of liver cells and conversely lowers the LDL concentration in the blood (Connor et al. 1989).

Connor et al. (1989) devised a cholesterol-saturated fat index (CSI) as a means of predicting the potential of a food or a diet to raise the total and LDL cholesterol. A low CSI indicates low cholesterol and saturated fat content of a food or diet and a decreased risk of CHD. A high CSI suggests an increased potential risk for CHD.

The traditional Mediterranean diet is approximately 35-40% fat and is rich in monounsaturated (primarily oleic) fatty acids (Grundy 1989). Whether this diet or the United States recommended diet (DHHS 1988 and NRC 1989) of 30% fat and approximately 15% oleic acid is preferable for decreasing risk of CHD is not known. The current American diet, which is 37% of calories from fat, is known to contribute to an increased risk of CHD because of its high ratio of saturated fats (DHHS 1988).

If the saturated fat and cholesterol contents of the diet have a greater cholesterol-lowering effect than monounsaturated fats, then Greeks in this study whose diets reflect low intakes of these nutrients, irrespective of high monounsaturated fat intakes, will most likely have the

lowest cholesterol values. Lower total fat intakes would also be more indicative of lowered CHD risk than a higher fat diet that contains predominantly monounsaturated fatty acids.

### Nutrition Intervention in Ethnic Populations

Research methods used to describe dietary behaviors of ethnic groups may also be useful in the analysis of transactions among any socially bounded group whose social network includes the sharing of a food system. Community nutrition research would benefit from studying the cultural dynamics of food behavior continuity and change before designing intervention strategies for decreasing dietary risk factors of CHD and other chronic diseases.

Pelto (1981) suggested that the application of approaches from anthropology to nutrition education research can provide the following components:

- 1) Participant observation to establish the ethnographic context--the characteristics of the community neighborhood, school, and other relevant social units.
- 2) The collection of qualitative and quantitative data.
- 3) The development of a broad data base, with collection of information on a wide range of variables.
- 4) The use of observational (intrusive or reactive) and unobtrusive measures as well as data collection techniques that rely on interviews.
- 5) The development of new data collection tools not only for measurement of food intake but also for measuring beliefs, values, and attitudes about food.
- 6) A multidisciplinary research team that includes community participation.

- 7) A research design that includes data on several levels of analysis: individual, family, community, and beyond to the broader society.
- 8) The use of methods of statistical analysis which preserve the expression of variability within the community and avoid the assumptions of homogeneity inherent in the use of averages.
- 9) The use of multivariate statistical techniques to elucidate the interactions among factors that affect people's dietary behavior.

The long-term goal of such research would be to produce information and analyses about the effect of technological, material, and ideological influences on community dietary behaviors which, in turn, would contribute to effective health policy development. By integrating data on ethnic food patterns and disease morbidity/mortality with nutrition education, government guidelines could be translated into dietary recommendations for various ethnic-American populations.

## CHAPTER 3

### METHODS

#### Pilot Study

##### Introduction

A pilot study was conducted on a small sample of Greeks and Greek-Americans living in Gainesville, Florida, during late Spring and early Summer 1986. The purposes of the pilot study were 1) to test Parts I-III of a questionnaire which were devised to collect data that describe demographic characteristics, dietary practices, and frequencies of food use among study subjects, and 2) to test whether the instrument was sensitive enough to register trends in aggregate groupings of the study population.

##### Methods

Subjects were enlisted at community group functions and by individual contacts. Group participants were recruited from a Sunday morning Greek Orthodox Church service, from a joint business meeting of the Greek Student Club and the Greek-American Student Club at the University of Florida, and from a meeting of the Gainesville Greek Women's Auxillary. Individuals were recruited at their place of business and employment (a Greek restaurant and Shands Hospital). Study sites represented the major places



frequented by Greeks and Greek-Americans who live in Gainesville. Subjects willingly filled out the study questionnaire. Only two females refused to participate in the study. Ten male and ten female Greek (n=7) and Greek-Americans (n=13) participated in the pilot study. Ages ranged from 20-79 years.

Arrangements for attending the group meetings in Gainesville were facilitated through the suggestions and invitation of a Visiting Greek Professor in Classics at the University of Florida. I attended the community functions and gave a questionnaire and pencil to Greeks and Greek-Americans in attendance. Questionnaire directions were self-explanatory. No coaching was volunteered. A few questions were asked by the subjects to clarify some of the written questions. Subjects took between 20-30 minutes each to answer the questionnaire and handed it in upon completion.

### Results

Greeks, who were family members, lived in the United States between 17-32 years. Greek singles emigrated from Greece more recently, between 5-8 years ago. Greek family members lived in Gainesville an average of 16.5 years, while singles averaged 3.5 years in Gainesville. Previous residence locations in the United States and outside of Gainesville included: Berkley, California, Fort Myers, Florida, and Tarpon Springs, Florida.



Families averaged 3.2 persons and singles 1.7 persons per household unit. Family households were composed of an average of 1.2 students, ranging from preschool through university. Singles were university students and only two single subjects had full or part-time employment. Years of education completed ranged from 13 to a Ph.D. degree.

Neither age nor gender appeared to influence Greek or Greek-American eating practices and food preferences. Socioeconomic status comparisons, as reflected in type of employment and years of education completed, showed no distinguishing trends either.

The majority of subjects observed yearly religious fasts and commemorated Greek holidays with special Greek foods. One Greek-American and one Greek male reported never observing religious fasts. Likewise, one Greek-American female and one Greek female did not practice this religious observance. These individuals, except for one person, did observe the Greek holidays in some way, however. Whether this represents individual preference or would be indicative of a trend in a larger study population could not be determined.

The most obvious differences in eating practices and food preference became apparent when Greeks and Greek-Americans were subdivided into family units and single households. Greek families showed stronger preferences for ethnic restaurants than for fast food restaurants, deli's or

vending machines. The majority of Greek-American families preferred the alternative choices of eating out. This trend was less pronounced with the Greek and Greek-American singles. At home, Greeks prepared more of their dishes with Greek ingredients and fewer with convenience foods than did the Greek-Americans.

Greek families showed a greater preference for feta cheese, white bread, olive oil, olives, Greek peppers, spinach-cheese pie, Greek pastries, yogurt, and Greek coffee than did their Greek-American counterparts. Greek-American families, on the other hand, exhibited stronger preferences for cheeses other than feta, peanut butter, meat, potatoes, rice and pastas, mayonnaise or salad dressing, milkshakes, doughnuts, danish, coffee cake and other American pastries, potato chips, whole milk (some preferred skim milk), chocolate milk, koolade or soft drinks.

Greek singles reported never eating french toast, pancakes, or waffles and preferred eggs more frequently than did the Greek-American singles. They do, however, prefer doughnuts, danish, and coffee cake more frequently than both Greek family members and Greek-American singles. Greek singles prefer yellow vegetables, ice cream and yogurt, in contrast to the preference of Greek-American singles.

Greek-American singles, like their Greek-American family member counterparts, prefer cheeses other than feta, peanut butter, mayonnaise or salad dressing, meat, potatoes,

rice, potato chips, and American pastries. In addition, they consumed the following foods more frequently than did the Greek singles: fish, poultry, olives, low-fat milk, herbal teas and diet drinks.

### Conclusions

The observed comparisons suggest the influence of technological and convenience factors in determining dietary behaviors, and also suggest varying degrees of change among the comparison groups. Greek families showed the greatest ethnic preferences in the dietary pattern. Greek singles, while still showing a preference for Greek foods, made some changes in the direction of a more Americanized diet. Greek-American family members had accepted American dietary practices. Greek-American singles, while choosing American-type foods, showed evidence of attempting to limit their fat intake in accordance with the United States government dietary goals for a lower fat intake. Except for the Greek-American singles' dietary patterns, these observations represent a trend in Greek dietary behaviors in the direction of acceptance of the American practices associated with increased risk of CHD. A larger sample will test whether this apparent trend in dietary change is significant.

The non-Greek questionnaire was also pilot-tested primarily for the purpose of testing the Ethnic Culture Scale. The ethnicity scale was first adapted for Greeks and

Greek-Americans by substituting the reference to Greek versus Italian, as used in Roches's (1984) modification of Sandberg's group cohesiveness scale. In order to adapt the statements to a non-ethnic population (the non-Greek cohort), statements were broadened to include attitudes about ethnic behaviors and feelings in general. For example, the statement "Jokes about Greeks bother me" was changed to "Jokes about ethnic people bother me."

Subjects to pilot-test the questionnaire were solicited by a printed announcement posted by the Information Desk, Alachua General Hospital Center for Health and Fitness, Gainesville, FL, during the summer of 1988. Twelve of the fifteen subjects, who volunteered to test the questionnaire, returned their completed questionnaires. Respondents were also asked to report the length of time required to complete the entire questionnaire and to comment regarding any ambiguously-worded questions.

Subjects represented a diversity of health-conscious, middle-class, Gainesville residents. Three subjects were students at the University of Florida and three were employed there. One subject was a restaurant owner, one worked in a hospital, one subject was an elementary art teacher, another was a homemaker, and two were self-employed. Ages ranged from the 20's to the 50's. Four subjects were 25-29 years of age, 3 were in their 30's, 4 in their 40's, and one was 50-60 years of age.



The time required to complete the entire questionnaire ranged from 15-90 minutes, with an average of 38 minutes per subject. Comments about question ambiguity focused most on the Ethnic Culture Questionnaire. The comments predominantly addressed a dislike for the forced-choice scale. They preferred to have a "no opinion" category. The only other consistency among the comments referred to the order in which the smoking questions were addressed. These situations were remedied by using a score of 3.5 when statements in the Ethnic Culture Questionnaire were not answered by a subject. A "no opinion" category was not added because the scale was originally designed as a forced-choice response. I chose the scale because it was previously tested with other ethnic groups (Roche 1984). Questions referring to smoking behaviors were rearranged to accommodate subjects' suggestions.

#### The Research Site

Tarpon Springs is located on the West Coast of Florida, in Pinellas County, along the Gulf of Mexico. It's first settlers were A.W. Ormond and his daughter, Mary, in 1876. It was founded in 1882 by Anson P.K. Safford and promoted as a resort. In 1890, John K. Cheney started the sponge industry in the waters of the Gulf of Mexico (Tarpon Springs Chamber of Commerce, 1986). In 1906, two sponge-diving brothers from the Island of Kalymnos, Greece, discovered the sponge beds and founded the Greek colony in Tarpon Springs,

Florida. More than 2,000 Greeks (mostly men) had established themselves in the colony by the beginning of World War I. Tarpon Springs became the world's largest sponge producer until the end of World War II.

During this thirty year period, Greek culture prospered in its American setting. Greek coffeehouses and nightclubs flourished in the wealth of the sponge industry. The population majority in Tarpon Springs was Greek. Unlike any other Greek enclave in the United States, it became an immigrant Greek Town. The Greek Orthodox Church, Saint Nicholas (named for the patron saint of seafarers), was established in 1907 (Moskos 1989).

Two factors caused the sponge industry's prosperity to decline after World War II: 1) the discovery of a method, in 1939, to convert wood waste pulp into synthetic sponge reduced the demand for natural sponges; and 2) a major outbreak of a disease, known as "red tide" which struck the west coast of Florida in 1947, decimated the sponge beds.

In the 1960s, the Tarpon Springs sponge industry began a comeback. Once again, Kalymnos divers began migrating to Tarpon Springs (Bernard, 1987). By the late 1970s, Greeks and Greek-Americans represented approximately one-third of the total population in Tarpon Springs. While the non-Greek population grew rapidly during these years, small numbers of Greek immigrants continued to arrive. Some young Greek men came to work in the town's small sponge and shrimp fleet.

The majority of Greek immigrants, however, were more likely to find employment in the local Greek restaurants or shops (Moskos 1989). Small numbers of Greek-American retirees from the north (several score a year, Moskos 1989:26) also entered the Greek community in the Tarpon Springs area.

The original Greek settlement was concentrated in an area known as "fishtown," (Moskos 1989:26) bordered by Pinellas and Tarpon Avenues and Dodecanese Boulevard. This area remains predominantly Greek today. Newer Greek arrivals, Greek retirees from the North, and more affluent Greeks live in the surrounding suburbs of Tarpon Springs and in surrounding towns (personal observation and verbal communication with personnel at the Chamber of Commerce).

The largest age group in the estimated population of Pinellas County in 1989 was the over-65 age group of whites (University of Florida Bulletin No. 89-90, 1989). Twenty-eight per cent of the white population is 65 years of age or older. Retirees from the upper mid-West and middle Atlantic States account for the majority of persons in this age group. Blacks compose only 8% of the estimated total population. The estimated population in Tarpon Springs is 18,000 (Polk Directory 1987). The Greeks are included in the white population estimates. The most recently published data (Census 1980) noted that more than 2,000 persons in Tarpon Springs are Greek-speaking. The membership roll at Saint Nicholas Greek Orthodox Church is not a good estimate

of the Greek population (according to personal communication with the Church Secretary) because there are several Greek Churches in the surrounding towns where Greeks from Tarpon Springs are members. Thus, the membership roll for one church would underrepresent the actual number of Greeks who live in Tarpon Springs.

### Sample

The study sample was obtained from the Greek population in Tarpon Springs and the surrounding areas. A comparison group of non-Greeks, from the same geographic area, was also studied. The sample was divided into three groups of adults, aged 25-74 years of age. Group 1 was a sample of 66 Greeks, who were Greek immigrants. Group 2 was a sample of 53 Greek-Americans (born in the United States of Greek descent). Group 3 was composed of a sample of 103 non-Greeks. Any non-Greek, who is married to or living with a Greek or Greek-American was excluded from the non-Greek group.

An attempt was made to obtain a random sample from Tarpon Springs. Streets were randomly selected from the "fishtown" area and surrounding suburbs. Names and phone numbers for persons living on the selected streets were obtained from the Polk Directory (1987). A Greek-American bilingual High School senior, who worked the evening shift at the Helen Ellis Hospital switchboard, made calls to 150 households from this list and, according to instructions,



briefly described the study and asked persons within the selected age ranges to participate in the study by making an appointment to come to the Walk-In Care, Holiday, Florida (the out-patient clinic of Helen Ellis Hospital, Tarpon Springs) on one of two week-ends. Of the eighteen persons who scheduled an appointment time and date to participate in the study, only five actually came to the study collection site. None of the participants were Greek or Greek-Americans. Reminder calls were made to the remaining 13 persons but they were unable to participate. I participated in a live talk show at the local Greek radio station the day before calls were being made, in an attempt to stimulate interest in the study and participation among the Greeks. Greek callers to the radio station during the talk show spoke enthusiastically about the study and inquired about how and where they could participate.

Alternate arrangements for recruiting study participants were negotiated with the Administrator and Director of Community Relations at the Helen Ellis Hospital, Tarpon Springs. They permitted me to attend a community-wide cholesterol screening and a health fair, which they were sponsoring, to recruit subjects and collect data for the study. Special arrangements were made with Naomi Patterson, a Greek-American who is the electrocardiogram supervisor at the Helen Ellis Hospital, to promote and provide transportation for persons from the

Greek community to attend these events and participate in the study. The cholesterol screening was held in a large corridor at the Tarpon Springs Mall, October 12-16, 1988. The health fair was held in the St. Ignatius Church's social hall, Tarpon Springs, March 31, 1989. A data collection site was also set up in the community hall at Saint Nicholas Greek Orthodox Church on Sunday, April 9, 1989. Greeks and Greek-Americans, who attended the church service on that day, were asked to participate in the study following the morning service.

The study sample was probably biased by being composed of persons who are more health-conscious than the average person in the total population or had been told on a previous occasion that their cholesterol value was elevated. To test for representativeness of the sample, data from the study were compared with a similar age group of persons from NHANES II (DHHS 1986-87), a large representative sample of the United States population. Table 3-2 describes these comparisons (p. 40).

The significant difference in the cholesterol values for the total samples and between the males in Tarpon Springs and NHANES may be explained by the significant differences observed between the Greek-Americans and Non-Greeks in Tarpon Springs. A larger proportion of the Tarpon Springs study sample was composed of Greek-Americans than the NHANES sample. Another explanation may be that the

Table 3-2: Data comparisons with NHANES

Ages 25-74 years						
	N	Greek Study	Range		NHANES	Range
Cholesterol		mg/dl	mg/dl		mg/dl	mg/dl
Total	126	212.5	118-369	9096	222.1*	135-330
Males	46	197.2	118-306	4302	219.0*	144-307
Females	80	220.3	118-369	4794	225.2	135-330
Blood Pressure						
		mm	mm		mm	mm
Total						
Systolic	128	129.1	90-176	9096	130.0	117-186
Diastolic	128	79.0	49-106	9096	80.6	72-103
Males						
Systolic	46	135.2	101-175	4302	132.2	123-183
Diastolic	46	83.2	56-106	4302	82.4	75-105
Females						
Systolic	82	126.0	90-176	4794	128.0	111-188
Diastolic	82	76.5	49-105	4794	78.8+	71-102
BMI Wt(kg)/Ht(meters-squared)						
Total	128	28.1	18.2-44.3	9045	27.2+	19.2-43.7
Males	46	28.2	21.0-44.3	4302	25.9*	19.2-33.7
Females	82	28.0	18.2-44.1	4743	28.4	19.8-43.7
*==significance at less than .01						
+=significance at less than .05						

Tarpon Springs sample had a health-conscious bias because subjects were recruited at health screening events. They may have decreased their cholesterol levels because of a previous elevated level.

Some of the females in the Tarpon Springs sample reported that they were runners and exercised aerobically on

a regular schedule. The significantly lower diastolic level and the lower values in the BMI range for women may be suggestive of the positive consequences that result from these exercise practices. Males, however, had higher BMI's in Tarpon Springs.

### Data Collection

Four primary methods were used for data collection. First a period of participant observation was used to develop an appropriately worded questionnaire and to provide context for interpreting the data from the survey. Initial introductions to key people within the Greek community were facilitated by a recently retired nurse supervisor from the local Health Department. During a two day visit to Tarpon Springs, March 1988, she arranged meetings and introductions with the local priest, a Greek physician, a Greek restaurant owner, an influential business man, who is associated with the sponge-diving industry, and women, who could do the Greek translation of the questionnaire and help with the data collection. Continuing contacts were maintained with these persons throughout the data collection period.

Publicity and advertisement contacts regarding the data collection times were made with presidents of the men's and women's Hellenic Benevolent Associations, local Greek organizations. Helen Makroulakis, president of the women's organization, invited me to speak about diet and cholesterol at their monthly noon meeting, October 6, 1988, and to



elicit participation in my study from those attending. Naomi Patterson recruited subjects from the organization for younger Greeks, the Philoptohos Society, of which she is a member. A study summary and announcements in both English and Greek were added as supplements to the Church Bulletin prior to data gathering events. The priest, Father Tryfon, made verbal announcements at the respective services. I was introduced to the editor of a local weekly newspaper, The Leader Today, by Chryse Flowers, a Greek-American of some prominence in the community. A description of my study appeared on the front page of the paper Saturday, October 8, 1988 (Appendix A). Mrs. Flowers attended the Sunday morning service with me at Saint Nicholas Greek Orthodox Church, October 9, 1988, to help recruit subjects and ask them to attend the cholesterol screening and participate in the study at the Tarpon Springs Mall, October 12-16. A Greek physician, was contacted prior to the data collection times and asked to lend his influence by encouraging Greeks and Greek-Americans to participate in the study.

The second data collection method was a self-administered questionnaire (Appendix B). The questionnaire was composed of five parts and was given to each subject at the data collection site. Each subject was encouraged to complete the questionnaire at the data site. Because of the length of the questionnaire (20 pages) some subjects refused to complete it at the site, but agreed to

fill it out at home for later pick-up or return to an agreed upon location. Of the total number of subjects, who participated in the study, 57% returned the completed questionnaire. Greeks had the lowest questionnaire completion rate (27%).

The self-administered questionnaire provided data concerning:

- 1) Demographic information
- 2) Smoking and exercise behaviors
- 3) Health history
- 4) Frequency of visits to Greece, if Greek or Greek-American
- 5) Social cohesion scale
- 6) Eating, food purchasing, and food use preferences
- 7) A food frequency check-list
- 8) A 24-hour food recall

Third, individual height and weight measurements were obtained. Height was measured in inches by having the participant stand, without shoes, on a specially-designed platform attached to a portable Accustat Stadiometer, marketed by Genentech, Inc. Weights were obtained by having the participants stand, without shoes, on a Sears Electronic Bath Scale, Model 6414. The scale weighs to the nearest half pound. Two 5-pound dumb bells were used to test the accuracy of the scale weight before and between data collection events. The dumb bells consistently weighed 9.5 pounds at each weighing. Height in inches was converted to meters by computer and weight in pounds was computer-converted to kilograms. The formula: Weight

(kg)/height (meters-squared) was used to compute body mass index (BMI).

The fourth method assessed the physiological parameters of blood pressure and total blood cholesterol. Subjects reported information about hypertension and cardiac disease, with any respective medications taken, in Part I of the questionnaire. Questions relating to a family history of hypertension, cardiac disease, diabetes and cancer were addressed in the questionnaire in relation to their parents' and children's medical histories.

Blood pressures were obtained by use of an automatic sphygmomanometer with a digital print-out (Biomega 423b, marketed by Biomega Corporation), which was loaned to me for the study by the director of the Alachua General Hospital Center for Health and Fitness, where I was employed part-time. The digitally-read numbers were advantageous in reducing subjectivity associated with human hearing and interpretation. Visually-read numbers can also be transcribed with greater reliability than verbal data. Participants were seated with the right arm cuffed and positioned in a right angle. The right forearm rested on a stable surface of appropriate height.

Blood cholesterol values were obtained from a digital read-out on a portable chemistry unit (Reflotron, marketed by Biodynamic Corp of Indianapolis, Indiana). The machine was loaned to me for the study by the Director of Community

Relations, Helen Ellis Hospital, Tarpon Springs. Volunteer retired nurses assisted with the blood drawing at the cholesterol screening and health fair. I hired a dietitian from Gainesville to assist with the blood drawing and trained her to run the cholesterol analysis at the Greek Orthodox Church data collection site, April 9, 1989. The State of Florida issued a regulation, effective January 1989, stating that only trained, licensed medical technologists may do blood drawings and run the analysis for cholesterol at cholesterol screenings. Laura Phillips, in the HRS Licensure Office, Jacksonville, Florida, assured me by phone that my research would be exempt under Regulation 483031 #3, if I did not collect money from the subjects or give them information about their cholesterol values in writing.

Drops of blood were obtained from a finger stick and absorbed onto a calibrated chem strip, which was machine analyzed in the chemistry unit. Chem strips were compared with standards to validate the machine analysis. Cholesterol values obtained by this method were reported in previous studies to vary within 5% of the true value of the standard sample (Brown 1988 and Sedor et al. 1987). This range is similar to the daily variation of 3-5% that has been observed with blood cholesterol levels (Garcia and Moody 1989). Recommendations for seeing a physician to have their blood pressure re-checked were made if the values were



greater than 140/90 mm and to have cholesterol values re-evaluated if the blood cholesterol level was greater than 220 mg/dl. They were instructed to see a physician if the level was greater than 240 mg/dl (NIH Consensus Conference on Cholesterol 1985).

### Sources of error in data collection techniques

#### Ethnicity measurement problems

A common problem with ethnicity measures is the paucity of standardized instruments which measure degrees to which members of an ethnic group are committed to the group and its traditions (Roche 1984). More frequently, studies (e.g., Sassen-Koob 1979; Woodrum et al. 1980; Cheung 1981) use descriptive analyses based on observed presence or absence of characteristics, determined by the respective investigator, to classify individuals into ethnic categories.

Another problem with ethnicity scales is a lack of standardized measures that allow cross-ethnic comparisons. For example, studies, like that of Burnam et al. (1987), employed analytical techniques to check internal validity of their acculturation scale. Its use, however, has been limited to Mexican-Americans and has not been tested in cross-ethnic studies.

I chose to use Sandberg's group cohesiveness scale (Sandberg 1972) for two reasons: 1). It was tested originally with Polish-Americans and later with

Italian-Americans (Crispino 1980 and Roche 1984).

Cross-comparisons among findings from the three studies suggest good external validity for the scale; and 2).

Questions addressed on Sandberg's group cohesiveness scale are similar to those addressed by Scourby (1979) in her study of ethnicity among three generations of Greek-Americans in New York City. Thus, the Sandberg group cohesiveness scale provides data that are comparable cross-culturally with other ethnic-Americans and comparable with findings from a similar Greek-American ethnicity study.

The scale (Appendix B: Part II of the study questionnaire) consists of thirty statements that measure participant attitudes toward various aspects of the ethnic group. Three subscales (cultural, national, and religious) identify intergroup similarities and differences. The cultural subscale elicits attitudes about traditions, language, music, and history of the group. The national subscale focuses on the sense of peoplehood shared by group members with questions about the ethnic neighborhood, being comfortable with fellow-ethnics, not changing one's name, being able to count on ethnic peers for help, marrying someone of the same nationality, and voting for candidates of the same ethnic background. The religious subscale inquires about the importance of the ethnic church, religious traditions and religious education.

### Dietary measurement problems

A major problem with the development of dietary instruments for population studies is the need for tools that can be readily and inexpensively used with large numbers of subjects and which yield accurate information about usual dietary patterns (James et al. 1981; Block 1982; Gray 1984). Sources of error can potentially be introduced during data collection, quantitative processing, and interpretation (Algert and Stumbo 1986).

The 24-hour recall method is one of the most widely used techniques for collecting dietary information on average group dietary intakes (Block, 1982). It has also been criticized for being unrepresentative of usual intake. Beaton et al. (1983) for example, found the major source of variance to be between and within subject differences from day to day.

As part of the Seven Countries Study (Keys 1980), systematic comparisons of dietary surveys were examined. Increasing the number of 24-hour measurements was not found to reduce intra-individual variation, but rather, provided a more reliable estimation of an individual's preferences, if validity of the data was assumed. An important finding of their comparisons was that the intra-individual variation, obtained by repeated surveys on the same individual, was of the same order of magnitude as the inter-individual variation within a group.

In an attempt to further define reliability of reported intakes, St. Jeor et al. (1983), demonstrated similar intra- and inter-subject variability of reported foods but insignificant differences in mean daily nutrient intake when compared with the nutrient analysis of one-week and three-week food logs. Protein was the only nutrient to change when days of the week were compared. The interaction between nutrient intakes for weeks and days of the week was significant only for calories and fat.

Thus, it would appear that 24-hour nutrient data can be representative of a group's intake. Or, as Young (1960) concluded after studying variation between three dietary sampling techniques (24-hour recall, dietary history, and 7-day record), the 24-hour recall provided the same values as the seven-day record when used with groups of at least fifty persons and when a 10% error rate was acceptable.

A confounding measurement error with 24-hour recalls is the conversion of foods to nutrients. There is inherent error in any nutrient data base. Climate, harvesting, handling, food processing and preparation affect nutrient values in given foods (Witschi et al. 1981). At present, a standard data base containing USDA food composition data and manufacturers' data provide the best values on which to base this research. Use of these data as a universal standard for all foods and nutrients is not always desirable, however, especially when analyzing dietary intakes of



populations residing outside the United States (Adelman et al. 1985).

The food frequency questionnaire is an easier and quicker method than the 24-hour recall. While it does not assess actual quantities consumed, it may achieve a more representative pattern of usual intake of foods (Chu et al. 1984).

Karinpaa and Seppanen (1983) demonstrated that agreement between a food frequency questionnaire and 24-hour recall was high for foods commonly eaten at a meal. Snack foods were reported more frequently during the 24-hour recall interview. Mullen et al. (1984) also observed that the checklist or frequency method produced greater agreement with observations of foods eaten at a meal than for meal accompaniments (e.g., nuts and seeds).

Used together, the food frequency questionnaire and the 24-hour recall provide a cross-check of foods reported along with additional information on dietary patterns and food practices (Christakis 1978). In general, descriptions of usual dietary intakes are more reliable when the dietary questionnaire is used with a 24-hour recall (Alford and Ekvall 1984).

The problem of informant inaccuracy is a critical factor to consider in survey research. A primary problem with data collection is to evaluate how accurately any recall method of collecting information resembles the

behaviors being measured. Bernard et al. (1984) observed that comparisons between what people say they do and observations of what they do bear little resemblance.

Bradburn (1983) refers to the types of bias which affect how subjects respond to interviews as "response effects," of which there are three classes:

- 1) deliberate errors of embellishment or omission of information for the purpose of impressing or not divulging certain information to the interviewer,
- 2) memory errors,
- 3) communication errors.

Variation in response effects may be influenced by the data gathering task, by the interviewer's performance or perceived role in the community, and by characteristics of the research subject. Bradburn (1983) noted that the empirical literature suggests that characteristics of the data gathering task are the major influence on response effects.

Bradburn (1983) further described comparisons of instrument administration methods. Face-to-face interviews, telephone, and self-administered questionnaires have high variance with no consistent direction in their biases. Self-administered forms appear to be slightly superior for items requiring definite information, questions requiring little interpretation, and items thought to be threatening or sensitive. Telephone interviews, in general, yield results similar to those obtained in personal interviews.

Face-to-face interviewing allows for use of cue cards or visual aids to improve recall. Increased motivation may also come from the interviewer being with the respondents in person to encourage them to take time to consider the questions carefully.

The time "window" involved in recall is reported to affect the size of memory errors (Bradburn 1983 and Bernard et al. 1984). The more recent the recall period (e.g., 24-hours vs a week), the more accurate the information. Bernard et al. (1984), however, observed that only 6% of informant accuracy could be accounted for by this factor in their data on recall of communications.

Can validity of dietary information be improved by obtaining weighed samples of foods eaten when compared with estimates of dietary recall? Studies from the Seven Countries Study (Keys, 1980) and Todd et al. (1983) conclude that the weighed sample method does not significantly improve subject reporting accuracy. Todd et al. found a one-day group dietary record to be a reasonable estimate (within 15%) of the weighed intake. Both methods had considerable inter- and intra-subject variability. Keys concluded that the difficulty and expensiveness of collecting replicates of all meals eaten, compared with the modest error reduction obtained, did not justify use of the weighing method of data collection.

Household refuse analysis (Rathje 1984) and biochemical markers (Christakis, 1981 and Willett et al. 1983) have been used to test the validity of reported dietary intakes. The increasing percentage of the food dollar on away-from-home food consumption in the United States (greater than 40%; Morgan and Goungetas 1986) limits the usefulness of household refuse analysis in verifying informant accuracy. While certain biochemical markers (e.g., adipose tissue and erythrocyte fatty acids, plasma carotene and alpha-tocopherol levels) have been shown to confirm reported dietary estimates of these respective dietary nutrients, analysis of biochemical parameters do not exist for all nutrients. Blood cholesterol levels, while not a direct measure of dietary fat or cholesterol intakes, are a useful clinical parameter for identifying persons who may be ingesting high saturated fat and cholesterol foods.

Thus, at best, recall data can only be interpreted as estimates of group trends and patterns. Because the goal of this research is to focus on dietary patterns of aggregate subgroups that may be suggestive of increased risk of CHD, averages of dietary intakes of saturated fat, cholesterol, calories, and fiber will be compared with the subgroups who have elevated cholesterol values as a validity check.

#### Methods for improving questionnaire validity

One self-administered questionnaire, using both the food frequency checklist and 24-hour recall, was utilized



per subject. Food models were available for memory prompting and to standardize serving sizes. This one quantitative measurement limited decisions about measurement differences between several dietary information gathering times. Prototypes of Greek and American diets were a proxy for time in this cross-sectional study. Greek and American diet prototypes were built from nutrition surveys and food consumption studies from the 1960s to the present. (Studies of Greek dietary practices include: Valassi 1962; Christakis et al. 1965; Ashton-Vouyoucalos 1975; Keys 1980; Lieberman and Gardner 1980; Kurtz et al. 1982; Freedman and Grivetti 1984. Studies of American dietary practices include: Ten-State Nutrition Survey 1968-1970; HANES 1971-73 and 1979; Nationwide Food Consumption Surveys 1977-78, 1985-86; Food and Nutrition Board 1986).

A Greek version of the questionnaire was available for those subjects who cannot read English. Back translation of the study questionnaire was performed by two Greek-speaking translators. The Greek version was translated from the English version by Maria Pantelis, a Greek immigrant who lives in Tarpon Springs. She also owns a Greek-type typewriter so that the questionnaire could be typed with Greek alphabet characters. The back translation to English was translated by a Greek graduate student, Elias Stassinou, who attended the University of Florida. He had no difficulty understanding the meanings and intent of the

words or the questions. His comment, however, was that the Greek language is constantly changing and for that reason he assumed the original translation was done by someone his mother's age, because of the phrasing used. His observation was true, but since most of the subjects would also be the age of the original translator, the translation was kept as originally interpreted. Some Greeks in Group 1 could not read either Greek or English. A family member verbally translated the questionnaire to them from the English version.

Back translation minimizes errors associated with asymmetrical interpretations of a source language into a target language. Loyalty to one language, usually the source language, dominates in asymmetrical interpretations. To assume that two languages could be equivalent fails to recognize the fundamental issue of culture differences.

Back translation, while not without limitations, is a method for identifying translation asymmetry. The most common error in back translation results from dictionary-equivalent redundancy (Warner and Campbell 1970 and Berkanovic 1980).

To test the validity of the dietary data, market trends were observed through informal interviews. A sample of twenty subjects were selected from locations where study subjects reported shopping for groceries or eating out. Subjects included grocery store managers, restaurant

managers, grocery shoppers and restaurant patrons. One restaurant manager and one grocery store manager would not allow me to interview their patrons. Grocery managers were interviewed about frequency of inventory turnover of items frequently reported by study subjects. Restaurant managers were interviewed about type of patrons and popularity of menus served. Grocery shoppers and restaurant patrons were interviewed about their perceptions of food behaviors in their respective communities. Reported food frequencies were grouped into the food groups: fruits and vegetables, beverages, grains, dairy, protein, fats and sweets. T-tests comparing mean frequencies of the total study sample by food group and mean frequencies of the validity sample by food group indicated no significant differences for all of the food groups except the protein and sweets groups. Mean for protein in the study sample was higher ( $p = \text{less than } .05$ ) than the validity sample. The reported frequency mean for sweets was lower ( $p = \text{less than } .05$ ) for the study sample than for the validity sample.

Overweight was defined in terms of the body mass index (BMI), as used in NHANES II (DHHS 1987). Overweight men had a BMI equal to or exceeding 27.8; and were severely overweight if the BMI equaled or was greater than 31.1. Women were overweight if the BMI was equal to or greater than 27.3 and were severely overweight if the value was equal to or exceeded 32.3. This definition defines

overweight as a BMI equal to or greater than the 85th percentiles of men and women ages 20-29 years as the reference population.

Nutrient analysis of foods reported on the 24-hour recalls were performed with The Nutritionist III Data Base, Version 4.5, 1989, marketed by N-Squared Computing, Salem, Oregon. The data base is derived from a documented USDA data base, manufacturers' data and recipes that are frequently updated. Greek foods and recipes were analyzed by using either similar foods and recipes or analyzing recipes by individual ingredients contained in the data set.

Mortality data for major cardiovascular diseases in Tarpon Springs, 1987, were obtained from the Florida Department of Health and Rehabilitation Services (HRS), Public Health Statistics Section, Jacksonville, Florida. One hundred, fourteen deaths were attributed to all major cardiovascular diseases during 1987, with 98 of them from heart disease. Forty-four deaths were reported from chronic ischemic heart disease (CHD) in Tarpon Springs. Twenty of the CHD deaths were among white males and twenty were white females. These figures would account for a mortality rate of 44:18,000 or 240 per 100,000. These data are not standardized for age. Comparing them to the age-standardized mortality rate in Greece (WHO 1986) of 85.1 per 100,000 is not a true comparison because the data are not age or ethnicity-standardized.



I attempted to obtain a mortality breakdown of deaths of persons from Greek descent, but found the task to be impossible because data are not recorded according to ethnic identity. Morbidity is not recorded for CHD by the State vital records or estimated with any reliability by Tarpon Springs physicians.

### Data Analysis

Research questions addressed in this study include:

- 1) Are there systematic change patterns in the observed dietary behaviors among...
  - a. Gender (Male vs Female)
  - b. Age groups
  - c. Ethnicity (Greek, Greek-American, and non-Greek)

when compared with...

- a. Number of years living in the United States (if Greek)
  - b. Socioeconomic status
  - c. Marital status and ethnicity mix, e.g., married to a Greek vs to a non-Greek, if Greek or Greek-American
  - d. Composition of the household, e.g., living alone vs in a multigenerational family unit?
- 2) Is there an observable pattern between structural processes, i.e., which promote technology and convenience, and infrastructural processes, i.e., cultural preferences, social norms, and religious practices in relation to change adoption patterns?
- 3) Are the observed dietary behaviors associated with a deviation from the traditional Greek diet and indicative of increased risk of coronary heart disease, as characterized by the American diet?

### Variables

Demographic variables included: gender, age, socioeconomic status, type of household, and (number of years living in the United States, if Greek) number of years

living in the Tarpon Springs area. Part I of the questionnaire provided these data. Socioeconomic status was determined with an SES clustering system described by Schneider (1986). In contrast to the Hollingshead scale which is an ideologically based measure of the status level of the working members of a household, the SES clustering system defines class as operationally and theoretically different from status.

Inherent in the Hollingshead scale is the concept that class represents the economic relationship of individuals to goods and opportunities for income in a market economy. Status groupings are thought to represent lifestyle and prestige attributed to individuals by society. Schneider, on the other hand, utilizes a Marxian concept of class which views class as the primary element influencing an individual's place in the social hierarchy. The particular role an individual fills "in the production process and relationship to others in the economic hierarchy will influence his/her access to the social product of society, including which neighborhoods they live in and schools they attend, life chances, and through socialization in a particular social place, world view" (Schneider 1986:211). She views the nature of a particular class society within an historical perspective and as a continuum of ethnicity, value systems, and current situations.

SES clusters utilize variables which include education level, occupation, self reported ethnicity, and relevance of ethnicity. The SES variable is statistically derived by cluster analysis.

Social cohesion scores were determined according to each of the three subgroups: cultural, national and religious components of ethnicity. A total score of the thirty items were referred to as the attitudinal ethnicity score. The lower the score, the greater indication of commitment to the group.

Preference for American foodways was operationalized to measure preference for eating in American steakhouses, fast food restaurant eating, and cooking at home with "American-style" recipes. Use of convenience foods and a microwave oven, discontinuation of the family meal in preference to eating individually, eating out at deli's or specialty diners or from vending machines reflected behaviors which represented convenience and technological motivation. Commercial influences were measured by questions regarding the frequency of food purchases because of coupon use, TV advertising, or recipe collection from popular women's magazines.

Continuity of Greek dietary practices was operationalized to represent frequency of participation in ethnic dining, e.g., eating at a Greek restaurant, choosing cuisines of similar ethnicity-- Mediterranean, eating in a

coffee house, and preference for cooking with Greek foods, e.g., olive oil, Greek peppers, feta cheese (all are available in grocery stores in Tarpon Springs).

Infrastructural variables, e.g., ethnicity, included data about frequency of observance of religious fasts and Greek/ethnic holidays. Parts II and III of the study questionnaire addressed these variables.

The food and nutrient patterns, in addition to eating times reported in Parts IV and V of the questionnaire, were compared with the Greek and American diet prototypes to further describe abandonment or persistence of Greek dietary behaviors among Greeks and Greek-Americans in Tarpon Springs. Variables, e.g., type of fat, percentages of complex carbohydrate and protein consumed, were used to describe the degree of Americanization of the dietary patterns and adoption of dietary practices associated with increased risk of coronary heart disease.

The hypothesis tested whether the observed dietary patterns demonstrate persistence of ethnic identity and food practices or change in relation to demographic, technical/material, and infrastructural influences. Data regarding obesity, elevated blood pressure, and elevated serum cholesterol were used to validate and explain risk factor status. Multivariate analysis models using Statistical Analysis Systems (SAS) programs, and including analysis of covariance, was used to describe the



interactions among the study variables in the respective ethnic groups. Significant variance between and among aggregate groups of individuals and ethnic groups were used to describe observed differences in dietary behaviors and risk factor status.

## CHAPTER 4

### RESULTS

#### Inference Tests

Data were collected between October 1988 and April 1989 from Greeks, Greek-Americans and non-Greeks who live in the Tarpon Springs area. Two hundred, twenty-six persons, aged 25-74 years, participated in the study. One hundred and twenty-eight persons (57%) completed the entire questionnaire, thus providing explanatory variables for the study. Comparisons between the two groups (Group 1=those who did not complete the questionnaire and Group 2=those who did complete the questionnaire) revealed differences between their body mass index ( $BMI = \text{weight in kgs} / \text{height in meters-squared}$ ), blood pressure and cholesterol values (Table 4-1 p. 64).

There were no significant differences between the two groups for Body Mass Index (BMI) or blood cholesterol levels. Differences in blood pressure values were highly significant at the .036 level for the systolic pressure and at the .005 level for the diastolic values. Therefore, data for the two groups were not combined for further analyses. Data from three persons, who partially completed the

Table 4-1: Comparisons of data collected from those who did not and those who did answer the questionnaire

Variable	Group 1	Group 2	T-Test p-values
N=	98	128	
BMI	28.9	27.6	0.077
kg/meters-squared			
N=	95	128	
Blood Pressure (mm Hg)			
Systolic	134.8	129.1	*0.036
Diastolic	83.5	79.0	*0.005
N=	57	126	
Cholesterol	226.9	212.5	0.077
(mg/dl)			

\*=significant at less than .05

Group 1=Those who did not complete the questionnaire

Group 2=Those who did complete the questionnaire

questionnaire, did not fall outside the ranges of values for the persons who completed the questionnaire in its entirety so their data were included with the group of persons who did fill out the questionnaire.

The total ethnicity score and its subscales (culture, religion, national), age, cholesterol, systolic blood pressure, diastolic blood pressure and BMI were further tested to see whether they met the assumption of normality. The probability that each of these variables had a normal distribution about the mean was accepted because their p-values were within a range of less than .01-1.0. Age had a slight skewness (.05; kurtosis -1.63). Body mass was

skewed (1.04; kurtosis 1.58) in the opposite direction, however both had p-values of less than .01 and could be accepted under the normal distribution assumption.

#### Demographic Characteristics of the Sample

The socioeconomic (SES) clustering system described by Schneider (1986) revealed two clusters with representative groupings of persons from lower and higher SES categories. These groups reflect the educational level achieved, the degree of skill, autonomy, supervision and type of employment which defines an individual's place within the local social hierarchy. Table 4-2 identifies these SES groupings by ethnic group.

Table 4-2: SES cluster by ethnic group

Ethnic Group Frequency Row Percent	Lower SES	Higher SES	Total
Greek	5 27.7	13 72.2	18
Greek-American	28 68.3	13 31.7	41
Non-Greek	37 54.4	31 45.6	68
Total	70	57	127
Persons with missing values were omitted from the comparisons.			

The Chi-square test of independence had a value of 8.329 with 2 degrees of freedom and a p-value of 0.016, indicates that there are significant ethnic group



differences in SES. Greeks had a higher proportion of study subjects in the higher SES group. Non-Greeks had a higher percentage of persons in the lower SES cluster.

The SES clusters revealed a significant ( $p=0.000$ ) relationship with age. The younger age group (25-49 years) contained 15% of persons from the lower SES group and 41% from the higher SES cluster. The older age group (50-74 years) contained a higher proportion of persons from the lower SES group (30% lower SES and 13% higher SES).

Subjects were asked to report age by decade (e.g., 25-29, 30-39, etc.). Mean age for Greeks fell within the fifties, for Greek-Americans and non-Greeks, mean age fell within the forties. Because of the small cell size when analyzing age with other variables in a multivariate analysis, age was subdivided into two grouping. Group 1 represented those persons who were less than 50 years of age. Group two was composed of persons 50-74 years of age. Table 4-3 (p. 67) illustrates the 2 age groupings by ethnic group.

The Likelihood Ratio Chi-square had a value of 6.155 with 2 degrees of freedom and a p-value of 0.046, indicating that ethnic group had a significant effect on age grouping. In later analyses where age had a significant effect, these analyses were controlled for age. When the Greek and Greek-American groups did not have significantly different effects on a parameter, these two ethnic groups

Table 4-3: Ethnic group by age group

Ethnic Group	Age Group Frequency Row Percent	25-49 years	50-74 years	Total
Greek		9 40.9	13 59.1	22
Greek-American		31 70.5	13 29.5	44
Non-Greek		34 52.9	31 47.1	65
Total		74	57	131

were combined, thus allowing for a more even age and frequency distribution between Greek and non-Greek comparisons.

Each age group had a higher proportion of females than males. Table 4-4 (p. 68) describes the gender composition of each age group by ethnic group.

Study subjects had lived in the Tarpon Springs area between 1-74 years. Thirty-five percent reported living in the area for four years or less. Half of them were new to the area within the past 9 years. Sixty-two of the study participants lived in Tarpon Springs for 9 or more years.

Three-fourths of the Greek subjects were born in Kalymnos, the island home of the original divers who founded the Greek colony in Tarpon Springs. More recent immigrants came from Athens, Agia and Patras. Two persons in the Greek ethnic group immigrated to the United States within the past

Table 4-4: Gender by age and ethnic group

Gender	Ethnic Group	Age Group		Total
		25-49 years	50-74 years	
Female	Greek	8	9	17
		47.1	52.9	
Male	Greek	1	4	5
		20.0	80.0	
Female	Greek-American	23	9	32
		71.9	28.1	
Male	Greek-American	8	4	12
		66.7	33.3	
Female	Non-Greek	20	15	35
		57.1	42.9	
Male	Non-Greek	14	16	30
		46.7	53.3	
Total		74	57	131

five years. One of these persons lived in Tampa prior to moving to Tarpon Springs. The other person immigrated directly from Athens and is living with a family member in Tarpon Springs. Seventy-two percent of the Greek ethnic group lived in the United States 25 years or longer.

#### Ethnicity

Among the Greeks, 61% had visited Greece within the past five years. Twenty-eight percent reported that they visited Greece more than three times during that period. In contrast, only 40% of the Greek-Americans reported that they had visited Greece within the past five years and only 15%

of them had visited Greece more than once or twice during that time.

Greeks and Greek-Americans differed in the number of religious fasting occasions that they kept. Fifty-eight percent of Greeks compared with twenty-four percent of Greek-Americans reported fasting weekly. Only one Greek and three Greek-Americans never fast. Three non-Greek persons reported fasting weekly and 69 percent reported never fasting.

Yearly holiday festivities were celebrated with special foods by 67 percent of the Greek ethnic group and 95 percent of the Greek-Americans. By contrast, only 46 percent of the non-Greeks used special holiday foods to celebrate yearly festivities.

Ethnic group cohesiveness was apparent among the Greeks and Greek-Americans from their ethnicity scores. The lower the numerical score for each scale, the greater the commitment to the ethnic group. The means for each subscale were consistently lower for the Greeks than for the Greek-Americans. Scores for the non-Greeks were higher than either of the Greek ethnic group scores. Scores for one subscale were predictive of the scores on the other subscales among the Greek ethnic groups but not among the non-Greeks.

The practice of fasting and holiday celebration with special foods compared positively with the ethnic group



cohesiveness scores. The exception was the national score for Greek-Americans. While Greek-Americans reported observing holidays with special foods more frequently than Greeks, this finding may reflect a tendency among the Greek-Americans to participate in both Greek and American holiday festivities. The use of special foods to celebrate holidays by both Greeks and Greek-Americans correlates with the lower national scores (greater national cohesiveness) for the two Greek ethnic groups.

During the time of the data collection, two Greeks were running for elected offices. Governor Dukakis was a presidential candidate and United States Congressman Bilirakis was campaigning for re-election. While a few study participants showed strong agreement or disagreement with the question inquiring about voting for candidates of the same ethnic background, no overall election opinion bias was detected among the majority of subjects' responses to this question.

Table 4-5 (p.71) describes the ethnic scoring differences between the study groups and their respective score correlation coefficients.

Ethnicity subscores were compared to Roche's (1984) ethnicity scores obtained from two samples of Italians and Italian-Americans who lived in suburbs of Providence, Rhode Island. Table 4-6 compares the two study scores (p. 71).

Table 4-5: Ethnicity scores by ethnic group

Scale	Ethnic Group N		Mean	Range	Correlation coefficients		
					Cult	Reli	Natl
Culture	GR	18	16.4	11.0-24.5	0.65	0.62	
	GA	40	19.7	10.0-35.0	0.78	0.58	
	NG	66	30.2	15.0-60.0	0.10	0.23	
Religion	GR	18	19.3	10.0-30.0	0.65		0.63
	GA	40	23.0	10.0-43.0	0.78		0.69
	NG	66	32.9	19.0-56.0	0.10		0.21
National	GR	18	23.3	11.0-34.0	0.62	0.63	
	GA	40	30.1	14.0-45.0	0.58	0.69	
	NG	66	35.1	17.5-47.0	0.23	0.21	

GR=Greek

Cult=Culture GA=Greek-American

Reli=Religion NG=Non-Greek

Natl=National

Table 4-6: Greek ethnic subscale comparisons with Italian-American subscale scores

Greek Scale	Italian		Score	N	Group	Score
	N	Group				
Culture	18	GR	16.4	52	IT	27.6
	40	GA	19.7	49	IA	28.2
	66	NG	30.2	27	AM	35.4
Religion	18	GR	19.3	52	IT	35.1
	40	GA	23.0	49	IA	36.1
	66	NG	32.9	27	AM	41.5
National	18	GR	23.3	52	IT	32.4
	40	GA	30.1	49	IA	32.0
	66	NG	35.1	27	AM	39.7

GR=Greek

GA=Greek-American

NG=Non-Greek

IT=Italian

IA=Italian-American

AM=American

The lower scores for Greeks and Greek-Americans in Tarpon Springs, compared to the Italians and Italian-Americans in Providence, is not surprising. The tourist industry in Tarpon Springs promotes the Greek culture. Greek and Greek-American businesses (e.g., sponge-diving, curio shops and Greek restaurants) are obvious throughout the town. The hourly chimes from Saint Nicholas Greek Orthodox Church is a constant reminder of the Hellenic influence in the environment. (The ringing of hourly chimes at the local church is a common practice in Greece). Identification with the Greek culture has economic benefits in Tarpon Springs.

Comparisons between the two studies show consistent trends. Italians who immigrated to the United States scored lower on each subscale than the Italian-Americans. Each Italian group scored lower than the American group. The culture score was lowest for both Greeks and Italians and the national score was highest. Religion appeared to be less influential in fostering group cohesiveness among the Italian groups than among the Greek groups. This observation is consistent with Moskos' (1989:34) observation that the Greek Orthodox Church is the focus of the immigrant Greek communities in the United States. Scourby (1979) also observed strong ties with the Greek Orthodox Church among the Greek community in New York City.

### Eating Preferences Affecting Food Use

The Greek group showed a high preference for eating at Greek restaurants (47% daily). Only two Greek individuals almost never eat at a Greek restaurant. The highest percentage (46%) of Greek-Americans eat at a Greek restaurant only monthly. The Greeks reported rarely eating at other ethnic restaurants (58% "almost never") or eating at an American steakhouse or fast food restaurant (25% - 33% "infrequently"). Half of the Greek sample never eat at a fast food restaurant and 90% never eat foods purchased from a vending machine (Appendix C).

The Greek-American group's restaurant preferences were similar to the preferences of the non-Greeks. Approximately half of the persons in these two respective ethnic groups ate at an ethnic or American restaurant monthly. One-fourth to one-third of persons in each group ate at a fast food restaurant either weekly or monthly. Greek-Americans showed a higher preference (35% monthly) for eating at a deli or submarine sandwich shop compared with the non-Greek's preference (25% monthly). Like their Greek counterparts, Greek-Americans almost never ate foods purchased from a vending machine (92%). By contrast, only 48% of non-Greeks never ate foods purchased from a vending machine.

Slightly greater than three-fourths (87% Greek, 77% Greek-American, and 75% non-Greek) of the sample gather at



home daily for a common household meal. A similar percentage of these persons report using basic ingredients in their cooking.

Differences in food preparation patterns were apparent from the use of convenience foods. Seventy-three percent of the Greeks report never using convenience foods and only 27% of them use a daily combination of convenience foods and basic ingredients. Half of the non-Greeks use a combination of convenience foods and basic ingredients daily compared to less than one-third of the Greek-Americans.

Non-Greeks use a microwave oven more frequently than the Greeks or Greek-Americans. Two-thirds of the non-Greek persons reported using it daily or weekly compared to 42% of the Greek-Americans, who use it daily or weekly. Eighty percent of the Greeks and 44% of the Greek-Americans never use a microwave oven. Only 17% of the non-Greeks reported never using a microwave oven to cook at home.

Type of meals prepared also showed differing trends between the ethnic groups. Greeks use "Greek style" recipes (83% daily) and Greek ingredients (75% daily). Slightly greater than one-third of the Greeks never eat "American style" recipes at home. As expected, the majority of non-Greeks use "American style" recipes daily. One-fourth of the non-Greeks report preparing "Greek style" recipes and use Greek ingredients monthly. One-third of the non-Greeks

reported never eating "Greek style" recipes or using Greek ingredients in foods prepared at home.

Greek-Americans show greater diversity in how meals are prepared at home. Two-thirds of them (40% daily and 28% weekly) use "Greek style" recipes and 59% of them (28% daily and 31% weekly) use Greek ingredients in the foods they prepare at home. While still maintaining some of the Greek food preparation methods, half of them (28% daily and 31% weekly) report cooking "American style" at home.

Commerical influences (e.g., TV advertisements, coupon use and collection of recipes from magazines) were much more evident among non-Greeks and Greek-Americans than among the Greek ethnic group. Seventy-one percent of the Greeks report never purchasing food or drinks advertised on TV or collecting magazine recipes. Half (50%) of them do not use coupons with food purchases. By contrast 46% of the non-Greeks and Greek-Americans purchased foods that were advertised on TV either weekly or monthly (non-Greeks, 29% weekly and 17% monthly; Greek-Americans, 23% weekly and 23% monthly). Forty-six percent of non-Greeks report not being influenced by TV advertisements in their food purchases and 35% of Greek-Americans do not purchase foods advertised on TV. Two-thirds of the non-Greeks and Greek-Americans, contrasted with 36% of the Greeks, used coupons weekly for food purchases. Eighteen percent of the Greek-Americans and

14% of the non-Greeks never use coupons while shopping for groceries.

Greek-Americans and non-Greeks collect recipes from popular magazines. Fifty-eight percent of the non-Greek group collect recipes from popular magazines monthly or more often. Fifty-four percent of the Greek-Americans collect recipes either monthly or yearly. Greek-Americans may use magazine recipes to learn to prepare American holiday foods.

#### Operationalized Comparisons of Dietary Preferences

In order to elucidate these trends by their operationalized categories of Greek or American dietary preferences, convenience and commercial influences, the questions were scored by assigning the categorical responses corresponding numbers. Daily was given a score of 1, weekly scored 2, monthly 3, yearly 4, and almost never scored 5. Responses for persons within each ethnic and numerical grouping were totaled and averaged so that scores fell with the 1-5 scoring range for each category. Table 4-7 describes these scoring comparisons (p. 77).

The aggregate response scores within the ethnic groups suggest differing levels of preference for Greek or American dietary practices, convenience and commercial influences. Trends were evident between the two Greek groups as well. As expected, Greeks demonstrated a greater trend for Greek than American dietary preferences. While Greek-Americans showed a stronger trend than Greeks for American dietary

Table 4-7: Averaged eating preference responses by ethnic group

Ethnic Group	Frequency Percent	Averaged Eating Preference Responses			
		Daily	Weekly	Monthly	Yearly
<u>Greek Dietary Preference</u>					
Greek	1	11	1	0	0
	8.3	74.9	8.3	0.0	0.0
Greek-American	2	24	12	0 0	
	5.3	63.3	31.6	0.0	0.0
Non-Greek	2	24	26	2	0
	3.8	44.8	48.3	3.8	0.0
<u>American Dietary Preference</u>					
Greek	1	3	6	2	0
	8.3	25.0	49.9	16.7	0.0
Greek-American	7	19	9	1	2
	18.5	50.0	23.8	2.6	5.3
Non-Greek	23	23	6	2	0
	42.6	42.6	11.2	3.8	0.0
<u>Convenience Preference</u>					
Greek	0	1	3	6	2
	0.0	8.3	24.9	49.9	16.7
Greek-American	2	6	16	8	6
	5.3	15.8	42.1	21.0	15.8
Non-Greek	0	13	26	13	2
	0.0	24.3	48.2	24.2	3.7
<u>Commercial Preference</u>					
Greek	0	0	6	2	4
	0.0	0.0	50.0	16.6	33.3
Greek-American	0	9	19	10	0
	0.0	23.7	50.0	26.3	0.0
Non-Greek	3	20	20	6	5
	5.6	37.1	37.1	11.2	9.3



preferences, the Greek-Americans demonstrated a slightly greater preference for Greek than for American foodways. Non-Greeks revealed a trend toward preferring Greek dietary practices occasionally (the non-Greek group was composed of a variety of persons from American, Italian, German and other European backgrounds).

The trend for commercial preference was higher among non-Greeks when compared to either Greeks or Greek-Americans. Greeks were least influenced by convenience.

To determine whether these trends could explain interrelationships among the study variables, a factor analysis (containing the eating preference variables and 43 other study variables) was performed. Three factors were retained because they met the prior communality estimate of 1.0. The initial factor method, with principle components, was used because the rotated varimax and standardized scoring coefficients did not explain any additional variance.

Factor 1, the Ethnicity Factor, explained 6.34% of the variance. Variables that had a loading of .50 or greater were preference for "Greek style" recipes, Greek recipe ingredients, the ethnicity subscores for culture, religion and nationality, fasting and holiday celebration with special foods.

Factor 2, the Medical Factor, explained 4.57% of the variance. This factor will be described later in the section pertaining to risk factors for CHD (page 121).

Factor 3, the Commercial Factor, explained 3.57% of the variance and had a loading on commercial dining, e.g., eating at ethnic and fast food restaurants, a deli or submarine sandwich shop, from a vending machine and purchasing foods which are advertised on TV.

None of the factors explained a high proportion of the variance (14.48%) among the variables. These factors were tested later in a multivariate regression analysis to determine whether they could explain any variance in the blood cholesterol values. These findings are presented in the section on blood cholesterol (page 121).

#### Frequency of Food Intakes

Reported monthly frequencies of intakes were grouped into the following food groups and compared (Appendix D): Quoted percentages refer to monthly frequencies unless stated otherwise.

##### Dairy Food Group

Within the dairy food group, Greek-Americans (54%) and Greeks (47% weekly, 0% monthly) reported consuming whole milk more frequently than non-Greeks (30%). The Greek persons, who did not consume whole milk, used skim milk (50%). Non-Greeks had a greater preference for low fat milk

(63%) compared to their skim milk (42%) and whole milk (30%) consumption pattern.

Cheeses were the most frequently consumed food within the dairy food group. Greek-Americans consumed feta cheese (89%) and other cheeses (93%) most frequently when compared with the Greeks (72% feta and 72% other cheeses) and non-Greeks (34% feta and 82% other cheeses). Yogurt was consumed more frequently by Greeks (72%) than by Greek-Americans (66%) or non-Greeks (41%). Frozen yogurt was eaten less frequently. A high proportion of Greeks (83%), Greek-Americans (84%) and non-Greeks (79%) almost never ate frozen yogurt.

Ice cream was consumed more frequently than milk by all ethnic groups. Greek-Americans reported the highest (78%) ice cream consumption, followed by non-Greeks (64%) and Greeks (56%).

#### Comparisons with the Greek Diet

Greeks in previous studies, consumed most of their dairy foods in the form of yogurt (Valassi 1962) and cheese (Christakis et al. 1965). The unpopularity of milk consumption in Greece was thought by Valassi (1962) to be attributable to insufficient quantities before the war and poor sanitation. Lack of pasteurization, except in large cities, and lack of refrigerization in homes made milk drinking unsafe. Christakis and Kurtz (unpublished data 1980 and 1982 and Valassi 1962) observed that sheep's milk,

customarily boiled and drunk hot with sugar added, is consumed more frequently than cow's milk in rural areas of Greece. Greek-Americans in the United States continued to prefer yogurt and feta cheese (Valassi 1962 and Costantakos 1987).

Vendors sell ice cream in the warmer months (April to September) in Greek towns and rural villages (personal observation and communication 1982). Greek immigrants and Greek-Americans enjoy ice cream in the United States throughout the year (Valassi 1962).

Greeks in Tarpon Springs appear to be consuming more milk than Greeks in Greece (Quantities were not indicated on the food frequency, so amounts at each consumption time may be low). The 24-hour recall indicates that Greeks consume most of their milk with cereal or coffee. Like Greeks and Greek-Americans in previous studies, preference for feta cheese, yogurt and ice cream is found among both Greeks and Greek-Americans in Tarpon Springs.

#### Comparisons with the American Diet

Nationwide food consumption studies (CSFII 1985) indicate that whole milk consumption decreased among United States men by 25% between 1977 and 1985 and by 11% among United States women (Popkin et al. 1989) during the same time period. Low fat and skim milk consumption increased by 53% for men and 18% for women in the respective study reports. Twenty-seven percent of men, aged 19-50, consumed



low fat or skim milk (CSFII 1985) compared with 44% of women who consumed whole milk and 49% who preferred low fat or skim milk in one of four non-consecutive days (CSFII 1986). Cheeses were consumed by United States women (71%) and men (33%) more frequently than yogurt (12% women; 2% men) per individual in an average day (CSFII 1985 and 1986).

The pattern of dairy food intake among the non-Greek group in Tarpon Springs is similar to reported intakes of these foods in the nationwide consumption studies. Sixteen percent of the non-Greeks in Tarpon Springs reported consuming whole milk daily, while 47% reported a daily intake of low fat milk and 34% preferred skim milk daily. Cheeses were consumed less frequently (3% feta and 12% other cheeses daily). Five percent of the non-Greeks reported daily consumption of yogurt.

#### Grain Food Group

Bread is consumed more frequently by Greeks and Greek-Americans than by non-Greeks. White bread is used most frequently by the Greeks (71% weekly and 53% daily). Thirty-five percent of the Greeks also consume brown bread daily. Greek-Americans and non-Greeks have a greater preference for brown bread (92% Greek-American; 91% non-Greek). Fifty-five percent of Greek-Americans and 52% of non-Greeks consume brown bread daily compared with 38% of the Greek-Americans and 30% of non-Greeks who prefer white bread daily. Pita bread is consumed more frequently by

Greek-Americans (36%) and Greeks (24%) than by non-Greeks (19%). Specialty breads, e.g., doughnuts, danish and coffee cakes, however, are preferred more frequently by Greek-Americans (65%) and non-Greeks (64%) than by Greeks (44%).

Two-thirds (67%) of the Greeks eat breakfast cereals but non-Greeks (89%) and Greek-Americans (87%) consume cereal more frequently. Other grains, e.g., pasta and rice are also consumed more frequently by Greek-Americans (100% pasta and rice) and non-Greeks (97% pasta; 92% rice) than by Greeks (94% pasta; 83% rice).

#### Comparisons with the Greek Diet

In Greece, bread is an indispensable part of every meal (Valassi 1962). Bread is usually eaten plain, without butter or jelly, and is used to absorb the oil and juices from salads and main dishes (personal communication and observation 1982).

Specialty breads, e.g., muffins, biscuits and sweet rolls are unknown in Greece (Lieberman and Gardner 1980). Pasta is eaten plain with tomato sauce or in combination with meat, as in pastitsio. Rice is characteristically prepared as pilaf or mixed with meat and seasonings and made into a stuffing for dolmathes (Valassi 1962 and Nickles 1969).

Greeks in Tarpon Springs continue to consume bread frequently. Specialty breads are eaten only rarely.

Greek-Americans, however, while continuing to have a high preference for bread, have also adopted the consumption of doughnuts, danish and coffee cakes.

Pasta and rice are consumed more frequently than breakfast cereals by Greeks. Greek-American consumption patterns of these foods more nearly resembles the non-Greek preferences.

#### Comparisons with the American Diet

Consumption of yeast breads and rolls decreased among men, aged 19-50, between 1977 (82% per day) and 1985 (74% per day). Sixty-six percent of women reported consuming yeast breads and rolls on the study day in 1985 (CSFII 1985 and 1986). Other baked goods were consumed at a frequency rate of 52% daily by men (CSFII 1985) and 58% by women (CSFII 1986). Daily cereal and pasta intakes were reported by 27% of the 19-50 year old men, with 15% of the reported intake being from ready-to-eat cereals (CSFII 1985). A comparable age group of women consumed cereal and pasta (66%) at least once during four non-consecutive days with 39% of them consuming ready-to-eat cereals (CSFII 1986). Twenty-five percent of men reported consuming mixed dishes, consisting mainly of grain (CSFII 1985) and 26% of women (CSFII 1986) consumed grain dishes.

Bread intake for the non-Greeks in Tarpon Springs was similar to bread intakes of the men and women in the USDA national study. Cereal intake was higher than the reported

national intakes. Prior to the data collection periods of the study in Tarpon Springs, news was released regarding the benefit of oat bran in reducing serum cholesterol levels. Informal conversations with the study participants indicated that they had increased their consumption of oatmeal, other oat bran cereals and oat bran baked goods. This increased awareness of oat bran's cholesterol-lowering property may account for the increased intake of cereal among the non-Greek study population in Tarpon Springs when compared with the intake of cereals reported in the earlier national studies.

#### Fruits and Vegetables Food Group

All three ethnic groups consumed citrus fruit and juices frequently (100% non-Greek; 95% Greek-American; 0% monthly and 94% weekly Greek). Only a few Greeks (6%) and Greek-Americans (5%) never consumed citrus fruits or juices. A high proportion of each ethnic group also consumed other fruits and juices (97% non-Greek; 95% Greek-American; 90% Greek). Fruit punch or drink was consumed most frequently by Greek-Americans (58%), followed by non-Greeks (46%) and Greeks (41%). Fifty-nine percent of the Greeks almost never consumed fruit punch or drink compared to the Greek-Americans (31%), who had the smallest proportion of persons who almost never consumed fruit punch or fruit drinks.



Potatoes were unanimously consumed frequently by all three ethnic groups. No persons from any of the three ethnic groups reported never consuming potatoes. Salty snack food varieties, e.g., potato chips and corn chips were consumed most frequently by non-Greeks (67%). Half of the Greek-Americans consumed snack food varieties monthly compared to 29% of Greeks, who consumed these foods.

Greeks consumed salad frequently (59% daily and 94% weekly). Slightly more than half (55%) of the Greek-Americans consumed green salads daily and almost all Greek-Americans (95%) consumed green salads weekly. Green salad consumption was reported less frequently by the non-Greek group (44% daily and 80% weekly). Eight percent of the non-Greeks reported never having green salads compared to no Greeks or Greek-Americans who never consumed green salads.

Greeks preferred yellow vegetables, e.g., squash and carrots (100%) to the green vegetables, e.g., broccoli, spinach, and green beans (94%). Greek-Americans consumed more green (100%) than yellow (91%) vegetables. Non-Greeks had a high preference for both types of vegetables (98% green; 100% yellow).

Intakes of olives and Greek peppers were reported more frequently by Greek-Americans (76% olives; 47% Greek peppers). Greeks consumed more olives and Greek peppers (61% and 39% respectively) compared to the non-Greek

preferences for these foods (49% olives and 32% Greek peppers). Twenty-eight percent of the Greeks and 37% of the non-Greeks compared with 8% of the Greek-Americans never consumed olives. Half of the Greeks (50%) and non-Greeks (56%) never consumed Greek peppers, while only one-third (34%) of the Greek-Americans reported never having Greek peppers.

#### Comparisons with the Greek Diet

Consumption of fruit is common in Greece. Most of the time, fruit is sliced or peeled and eaten raw as a dessert (Valassi 1962; Lieberman and Gardner 1980). The Greek population has continued to enjoy fruits, especially citrus fruits, in Tarpon Springs. A greater proportion of Greek-Americans have more readily adopted fruit punches and fruit drinks.

Potatoes, in Greece, are characteristically fried with olive oil in a frying pan and eaten at mealtime, rather than as a snack. The custom of having potatoes primarily for meals has continued among the Greeks in Tarpon Springs. Greek-Americans report consuming potato chips occasionally, but not with the same frequency as the non-Greeks.

In Greece, Greeks enjoy a variety of raw and cooked vegetables. Raw salads are served daily (Valassi 1962; Lieberman and Gardner 1980). While continuing to prefer green vegetable salads in Tarpon Springs, relative to the frequency of non-Greek use, green salad consumption for

Greeks and Greek-Americans is not as indispensable an item with each meal as in Greece. Together with green and yellow vegetable consumption, vegetable intakes are greater for Greeks and Greek-Americans in Tarpon Springs than for non-Greeks.

The higher preference for olives and Greek peppers by Greek-Americans, compared with Greeks, may be due to a more selective preference for type of olive and pepper consumed. For example, Cretan olives do not look or taste the same as olives grown on the mainland of Greece (personal observation and communication 1982). Greeks in Tarpon Springs may prefer only the type of olive that is native to their region of origin in Greece, therefore limiting the selection of olives in Tarpon Springs. Greek-Americans, on the other hand, may enjoy all types of olives and find them more readily available in any grocery store.

#### Comparisons with the American Diet

Fruit intake for men (CSFII 1985) increased eleven percent between 1977 and 1985. For women, there was no reported increase during the comparable time period (Popkin et al. 1989). Twenty-three percent of men (CSFII 1985) reported daily fruit or fruit juice consumption and 29% of women (CSFII 1986) reported consuming fruit on the study day. Two-thirds of the non-Greeks in Tarpon Springs reported consuming fruit or juice daily. This greater preference for fruits and fruit juices by the non-Greeks,

compared to persons in the national studies, may be associated with the availability of fresh fruits and the promotion of orange juice in Florida. Fresh fruits grow in private lawns and vine-ripened produce is marketed all year at road-side stands in Tarpon Springs and the surrounding areas.

Vegetable consumption increased by 3% for men, aged 19-50, and by 4.9% for women between 1977 and 1985 (CSFII 1985 and Popkin et al. 1989). Eighty-five percent of the men consumed vegetables on the survey day in 1985. Potatoes were consumed by 51% and tomatoes by 42%. Only 4% consumed dark-green vegetables and 6% reported eating deep-yellow vegetables. Sixty-nine percent ate other vegetables. Forty-one percent of women, aged 19-50, consumed potatoes and more women ate dark-green (11%) and deep-yellow (11%) vegetables than men. Tomatoes and other vegetables were 31% and 65% consumed respectively by women (CSFII 1986).

Non-Greeks in Tarpon Springs demonstrated a stronger preference for vegetables than the national studies indicate (57% green vegetables and 42% yellow vegetables daily). Potatoes were eaten less frequently (22% potatoes and 5% potato chips daily). The availability of fresh produce in Florida may account for the increased preference for vegetables among the non-Greek group in Tarpon Springs compared with the national sample. This difference may also



be indicative of a selection bias for foods associated with health among the non-Greek group in the study.

#### Protein Food Group

Fish was consumed more frequently (100%) than poultry (89%) or meat (83%) by the Greek group. The preference of Greek-Americans for fish (100% and poultry (98%) was nearly equal. The frequency of meat consumption, by Greek-Americans, was 90%. Non-Greeks consumed poultry (97%) in preference to fish (94%) and meat (91%). Eleven percent of the Greeks never ate meat and 6% reported never eating poultry. By contrast no Greek-American never consumed meat or fish and only 3% never consumed poultry. Eight percent of the non-Greeks never eat meat and 3% reported never eating fish or poultry.

Seventy-seven percent of the Greeks consumed eggs compared to 85% of the Greek-Americans and the non-Greeks. Lentils, chickpeas and dried beans were consumed more frequently by the Greeks (89%) than the non-Greeks (83%) and Greek-Americans (78%). Fourteen percent of the non-Greeks reported never consuming legumes compared to 5% of the Greek-Americans who never consumed them. Non-Greeks appeared to interpret the question as consumption of baked beans while the Greeks and Greek-Americans responded by reporting their consumption of lentils and chickpeas.

Peanut butter consumption was most frequent for the non-Greeks (71%) and least frequent for the Greeks (35%).

Greek-Americans consumed it moderately (59%). Fifty-nine percent of the Greeks never consumed peanut butter compared to the non-Greeks (25%) and Greek-Americans (21%) who report never eating it.

Taramosalata, called "Greek caviar," is rarely consumed by Greeks (18%) and Greek-Americans (11%). Ninety-four percent of the non-Greeks never ate it. Several non-Greek participants asked me what this food was while they were answering the questionnaire.

#### Comparisons with the Greek Diet

Fish is well-liked and eaten frequently in areas of Greece which are bordered by water (Valassi 1962). Lamb and pork are meats that are eaten more frequently than beef in Greece. Poultry and eggs are used in soups and main dishes. The quantities of meat consumed in Greece are less than in the United States (Newman 1986). Lentils are often referred to as "the meat of the poor" in Greece. Beans, peas, lentils and chickpeas are used extensively in Greece (Valassi 1962). Greeks and Greek-Americans in Tarpon Springs reported consuming fish, poultry and meat more frequently than lentils.

Simopoulos (1989) reports that eggs in Greece contain substantial amounts of n-3 fatty acids, compared to eggs produced in industrialized countries. Chickens, in Greece, range and feed on the farms where purslane, a green leafy vegetable, grows wild. Purslane was found in an earlier

study (Simopoulos and Salem 1986) to be one of the richest sources of n-3 fatty acids, especially docosahexaenoic acid. This fatty acid has been observed to reduce the risk of coronary heart disease. Thus, eating eggs from chickens in Greece may have a protective effect against the development of heart disease.

#### Comparisons with the American Diet

In the United States, beef consumption decreased 35% among men and 43% among women, aged 19-50 years, between 1977 and 1985 (CSFII 1985 and Popkin et al. 1989 respectively). Poultry consumption decreased by 22% for men and 8.5% for women and fish consumption increased by 50% for men and 9% among women in the same studies. Meat consumption among men was 86%, poultry consumption was reported by 16% and fish by 11% on the day of the study (CSFII 1985). Sixty-nine percent of women consumed meat, 21% reported poultry consumption and 12% consumed fish on the study day in 1986 (CSFII 1986).

Thirteen percent of the non-Greeks in Tarpon Springs reported consuming meat daily and 77% weekly. Poultry was consumed by 17% of the non-Greeks daily and 91% weekly. Fish was consumed by 5% of the non-Greek study group daily and 72% consumed fish weekly. Poultry and fish were consumed more frequently by the non-Greeks in Tarpon Springs than by the USDA study population. This trend may have been influenced by the National Cholesterol Education Program

which was released and promoted in 1988 (NIH 1988). It produced and distributed information about reducing fat and cholesterol intakes and provided suggestions and sample menus for how to achieve these goals. Media coverage of these issues was also prolific, with articles in popular magazines and public service announcements on TV. The self-selected health-conscious bias of the sample may be another explanation for this trend.

Tarpon Springs is located on the Gulf of Mexico. Fish is caught and served frequently in Greek restaurants and other restaurants in the Tarpon Springs area. These environmental factors may also contribute to the higher frequency of fish consumption among the non-Greeks in the study.

#### Fat Food Group

Greeks (89%) and Greek-Americans (85%) reported frequent consumption of olive oil, compared with the non-Greek consumption (53%). Thirty-nine percent of persons in the non-Greek group never consume olive oil, while only 6% of the Greeks and 8% of the Greek-Americans report never using olive oil. Other vegetable oils are used frequently by all three ethnic groups. Eighty-one percent of the Greeks (0% monthly) reported consuming other oils weekly. Half (50%) of the Greek-Americans and 70% of the non-Greeks use vegetable oils weekly.



Butter is preferred more frequently by Greek-Americans (50%) and Greeks (39%) than by non-Greeks (29%). Non-Greeks consume margarine more frequently (91%) than butter. Greeks (83%) and Greek-Americans (83%) demonstrate a high preference for margarine as well.

Differences become apparent between the groups in their preferences for mayonnaise or salad dressings. Thirty-one percent of the Greeks report using them compared to 85% of the Greek-Americans and 81% of the non-Greeks who consume mayonnaise or salad dressings.

Greeks report never (100%) using whipped cream compared with 21% of the Greek-Americans and 27% of the non-Greeks who consume whipped cream. Ninety-four percent of the Greeks never consume non-dairy whipped toppings and only 6% use it infrequently. Twenty-eight percent of the Greek-Americans and 36% of the non-Greeks use non-dairy whipped toppings. Approximately three-fourths of the persons in each ethnic group never use coffee cream. Of the Greeks who use cream, a higher percentage (22%) prefer cream to non-dairy creamer (13%). Greek-Americans (31%) and non-Greeks (30%) prefer the non-dairy creamers to coffee cream (16% Greek-Americans and 23% non-Greeks).

#### Comparisons with the Greek Diet

Olive oil is the predominant fat used in Greek cookery (Valassi 1962; Christakis 1965; Lieberman and Gardner 1980).

Food is not considered tasteful and well-prepared unless fat has been added in large quantities.

In the United States, imported olive oil is expensive. Greek immigrants and Greek-Americans use other vegetable oils in cooking when taste is not affected. Olive oil is still preferred for salads (Valassi 1962).

Butter is used in some meat and vegetable dishes and in dessert making. In Greece, there is no equivalent use for whipped cream or coffee cream. Greek coffee is laced with sugar and drunk without cream (Valassi 1962; Newman 1986; personal observation, communication and sampling 1982 in Greece and 1988 in Tarpon Springs).

Greeks in Tarpon Springs have a continuing preference for olive oil, although they have also adopted the use of other vegetable oils. Salads are consumed with olive oil and lemon juice dressing. Greek-Americans have included mayonnaise and salad dressings as a frequent preference.

Butter is preferred by Greeks and Greek-Americans more than by non-Greeks in Tarpon Springs. However, margarine is widely accepted by all three ethnic groups.

Coffee cream has been accepted by a few Greeks and even fewer Greeks consume non-dairy creamer. No whipped cream is consumed by Greeks in Tarpon Springs. Consumption patterns of these fat items by Greek-Americans more nearly resemble the non-Greek dietary patterns. Whipped cream, however, is not used by 71% of the Greek-Americans.

### Comparisons with the American Diet

Consumption of fats and oils by men in the United States, aged 19-50 years, increased by 6% between 1977 and 1985 (CSFII 1985). Women increased their intake of lower fat salad dressings by 2.1% and higher fat salad dressings by 1.2%. Use of butter or margarine increased by 5.8% among women, aged 19-50 years, between 1977 and 1985 (Popkin et al. 1989). Forty-one percent of the men consumed table fats and 34% consumed salad dressing on the day of the study (CSFII 1985). A similar number (40%) of women consumed table fats and salad dressings (34%) on the study day (CSFII 1986).

Sixty-nine percent of non-Greeks in Tarpon Springs consumed margarine daily and 13% used mayonnaise or salad dressings. Non-Greeks in Tarpon Springs consumed more margarine but less salad dressing on the study day. The differences balanced the fat intakes so that the total fat from these sources was approximately equal to the intake reported in the national studies per day.

Olive oil consumption among non-Greeks was surprisingly high. Only 39% reported never consuming olive oil. This finding suggests that the Greek environment in Tarpon Springs has influenced the increased usage of olive oil among non-Greeks who live in the area. Only 5 persons (7.6%) in the non-Greek group were of Italian origin

(none were of Spanish origin) and may have been raised with a taste preference for olive oil.

### Beverages

A majority of persons in each of the three ethnic groups reported drinking coffee and tea (71% Greek, daily and none weekly or monthly; 80% non-Greek; 85% Greek-American). Greeks showed a greater preference for Greek coffee (63%) than Greek-Americans (29%) or non-Greeks (5% weekly and none monthly). Ninety-two percent of the non-Greeks reported never drinking Greek coffee.

Greek-Americans and non-Greeks showed a greater preference for decaffeinated coffee or tea (56% Greek-American; 53% non-Greek) and diet drinks or soda (59% Greek-American; 64% non-Greek) than Greeks (33% decaffeinated beverages; 33% diet drinks or sodas). Sixty-one percent of the Greeks reported never drinking diet drinks or sodas.

Herbal teas and hot chocolate were preferred by Greeks (28% weekly for both herbal teas and hot chocolate) and Greek-Americans (47% herbal teas and 33% hot chocolate) rather than by non-Greeks (21% herbal teas and 23% hot chocolate). Seventy-three percent of non-Greeks reported never drinking herbal teas. Preference for regular koolade or soft drinks (non-diet) was similar for each ethnic group (41% Greek-American; 44% Greek; 46% non-Greek).

Non-Greeks showed a greater preference for alcoholic beverages (beer, wine, whiskey, or ouzo). Fifty-six percent



of the non-Greeks drank alcoholic beverages, as compared with 41% of the Greek-Americans and 35% of the Greeks. More Greeks (53%) and Greek-Americans (41%) reported never drinking alcoholic beverages than non-Greeks (34%).

#### Comparisons with the Greek Diet

Greek coffee is the beverage usually served in Greece. It is strong with grounds in the bottom of the cup. Sugar is used to sweeten it (Newman 1986). Open markets, in Greece, display a wide selection of various herbal teas. A vendor in Crete explained the medicinal benefits attributed to each type of herb (personal communication 1982), e.g., mints for gastric upset and cleansing.

Wine is made in many rural households in Greece. Kegs are stored in cool cellars (personal observation, communication and sampling 1982). Wine is served to family members five years and older with special holiday meals. Men drink alcoholic beverages at the coffeehouses, where they gather regularly. Coffeehouses are off-limits to women, so female consumption of alcoholic beverages is more limited than for men (Nickles 1969).

Greeks in Tarpon Springs have accepted American coffee but have also retained a strong preference for Greek coffee. Herbal teas are used by a small proportion of Greeks. The greater number of females (77%) in the Greek ethnic group probably account for the lower reported frequency of

alcoholic beverage consumption, if the Greek women are limiting the use of alcoholic beverages to special occasions.

#### Comparisons with the American Diet

Ninety-one percent of men and 90% of women, aged 19-50, reported drinking coffee or tea (CSFII 1985 and 1986) daily. Regular soft drink consumption increased among men, aged 19-50 years, by 43% between 1977 and 1985. While fewer men were drinking diet soft drinks (16% diet soft drinks vs 48% regular soft drinks) the mean intake of diet soft drinks consumed increased by 494% between 1977 and 1985 (CSFII 1985). Thirty-five percent of women reported drinking regular soft drinks and twenty-three percent drank diet soft drinks on the study day in 1986 (CSFII 1986).

Alcoholic beverage intake increased by 7.5% for men, aged 19-50, between 1977 and 1985. Twenty-seven percent of men reported drinking an alcoholic beverage on the study day (CSFII 1985). Fourteen percent of women drank alcoholic beverages on the study day and twenty-nine percent of women reported consuming alcoholic beverages at least once during four non-consecutive days (CSFII 1986).

The majority of non-Greeks in Tarpon Springs preferred coffee or tea (70% daily and 76% weekly). Approximately one-third of them (32% daily and 39% weekly) preferred having it decaffeinated. Unlike the national sample, in Tarpon Springs, a greater percentage of non-Greeks preferred diet soft drinks rather than regular soft drinks. Alcohol

consumption by the non-Greeks was similar to reported frequencies in the national studies.

### Pastries and Sweets

Greeks showed the greatest preference for spinach-cheese pie (56%) and sweet Greek pastries (61%). Sixty-four percent of the non-Greeks reported never consuming spinach-cheese pie or other Greek pastries. Greek-Americans reported eating the spinach-cheese pie (44%) and other Greek pastries (35%) but with less frequency than the Greeks.

Non-Greeks demonstrated a high preference for non-Greek pastries, e.g., cookies and cakes (80%). Greek-Americans (68%) and Greeks (50%) also showed a preference for non-Greek pastries. Greek-Americans and non-Greeks showed a greater preference for hard candies (40% Greek-American; 38% non-Greek) and chocolate candies (64% non-Greek; 53% Greek-American) than the Greek ethnic group (12% hard candies; 44% chocolate candies). All three of the ethnic groups consumed sugar about equally (56% Greek; 62% Greek-American; 58% non-Greek).

More Greek-Americans (73%) consumed syrup or honey than Greeks (60%) or non-Greeks (57%). However, jam or jelly was preferred more frequently by non-Greeks (74%) and Greek-Americans (71%) than by Greeks (47%). Almost half (47%) of the Greeks reported never consuming jam or jelly.

### Comparisons with the Greek Diet

Greek pastries, e.g., spinach-cheese pie and sweet pastries are generally served as a snack or to guests in Greece, rather than as a dessert as with the non-Greek dietary pattern (Nickles 1969). Greek-Americans in Tarpon Springs appear to enjoy Greek pastries along with the Greek ethnic group and, like the non-Greeks, have also incorporated non-Greek pastries into some of their meals (as observed in the 24-hour recall reports in this study). Some non-Greeks appear to have taken advantage of the Greek cuisine in Tarpon Springs and have included Greek pastries into their diet patterns occasionally.

Christakis et al. (1965) reported that rural Cretans produce and consume honey and grape syrup. In Tarpon Springs, honey and syrup are also part of the Greek dietary pattern. Greek-Americans had a higher preference for syrup and honey, compared to the Greek ethnic group, perhaps related to their higher intakes of pancakes and waffles which are served with syrup.

Bread is consumed without jam or jelly in Greece (Valassi 1962; Lieberman and Gardner 1980). Valassi (1962) observed that Greek-Americans are adopting the use of jam or jelly with bread for breakfast. In Tarpon Springs, Greeks reported the least frequent use of jam or jelly. Forty-seven percent of the Greeks never use jam or jelly.



Candy has not been mentioned as part of the Greek diet (Valassi 1962; Christakis et al. 1965; Lieberman and Gardner 1980). Nickles (1969) observed that the Greek hostess unfailingly keeps on hand at least one kind of rich, fruity "spoon" sweet. It is a fruit syrup preparation meant to be eaten with a spoon. This spoon sweet represents a social ritual (Nickles 1969 and personal communication and sampling 1982) and appears to replace the offering of candy to guests, as might be observed in some non-Greek homes.

#### Comparisons with the American Diet

A greater proportion of women (6.1%), aged 19-50, consumed higher fat desserts in 1985 than in 1977 (Popkin et al. 1989). The proportion of men who consumed sugars and sweets decreased by 19% between 1977 and 1985 (CSFII 1985). Eighty-nine percent of women reported consuming baked goods, other than yeast breads or rolls, at least once during four non-consecutive days in 1985. Almost two-thirds of them (61.3%) consumed sugars and 35% reported eating candy (CSFII 1986). Fewer men reported eating baked goods, other than yeast breads and rolls (52.1%), sugars (31.4%) and candy (10.8%) on the study day (CSFII 1985).

Non-Greeks in Tarpon Spings reported consuming pastries, e.g., cakes and cookies, less frequently than reported in the national studies (12.5% daily; 42.2% weekly). Sugar (32.8% daily and 50% weekly) consumption appeared to be similar to reported intakes in the national

studies. (Questions asked in the national study and the Greek study were not entirely comparable, making exact comparisons impossible. The comparisons do, however, indicate similar consumption trends).

Preference was higher for chocolate candy (3.1% daily; 31.3% weekly) than for hard candy (3.1% daily; 17.2% weekly) for the non-Greeks. This consumption trend appears to be similar to the USDA study reports. The trend to eat fewer baked goods by the non-Greeks in Tarpon Springs can probably be attributed to a conscious effort to decrease cholesterol levels. While the data indicate that the non-Greeks have not eliminated baked goods from their diets, data do suggest that they are limiting the consumption of these foods to fewer times per week.

#### The 24-Hour Recall

The previous sections on eating preferences and food frequency intakes indicated that the three ethnic groups followed different food use practices. The 24-hour recall summarizes these differences in terms of nutrient intakes. Table 4-8 illustrates these differences in nutrient intakes (pg. 104). While there were differences between the ethnic groups for most of the nutrients, only a few of these differences attained significance (less than .05) when they were compared across ethnic groups.

Grams of monounsaturated fatty acids (MFA  $p=.013$ ) and % MFA ( $p=.026$ ) were significantly higher for the Greeks and

Table 4-8: Nutrient intakes reported in the 24-hour recall by ethnic group

Means/ Ranges N=	GR 16	Ranges	GA 39	Ranges	NG 66	Ranges	p
Calories	1976	437-3315	1744	582-3329	1559	602-3909	.098
CHO, gms	229	53-440	197	16-541	191	65-529	.387
Pro, gms	87	31-194	76	12-218	69	17-170	.289
Fat, gms	71	10-115	70	14-165	55	8-191	.060
% CHO kcal	45	25-58	44	12-66	48	25-73	.116
% Pro kcal	19	9-38	18	5-45	18	9-34	.877
% Fat kcal	32	3-46	35	11-62	31	8-49	.086
SFA, gms	24	4-46	21	5-49	20	3-71	.378
MFA, gms	30	3-63	27	6-88	19	2-70	*.013
PUFA, gms	12	1-27	12	1-32	10	1-41	.430
% SFA kcal	11	5-19	11	4-20	11	2-26	.976
% MFA kcal	13	4-24	14	4-38	11	2-25	*.026
% PUFA kcal	5	1-10	6	1-14	6	1-19	.616
Dietary Fiber, gms	14	6-28	13	1-38	11	0-32	.243
%Fiber RDA	55	25-114	52	4-151	30	0-126	.225
Alcohol, gms	4	0-30	6	0-52	5	0-98	.952
% Alcohol kcal	1	0-10	2	0-12	2	0-38	.846
per 1000 kcal							
Na, mg	1261	405-2146	1221	354-2118	1602	512-5044	*.008
K, mg	1620	628-2781	1567	541-2910	1813	622-3794	.120
Chol, mg	114	64-146	112	28-163	123	64-184	.083
Ca/Phos	0.6	0.4-1.0	0.5	0.2-0.9	0.7	0.2-1.2	*.000
CSI	40.6	8-81	33.3	8-75	30.2	4-94	.118

\*=significant

Chol=Cholesterol

MFA=monounsaturated fatty acids

SFA=saturated fatty acids

PUFA=polyunsaturated fatty acids

kcal=Calories

Ca/Phos=Calcium to Phosphorus Ratio

Na=Sodium

CSI=Cholesterol to Saturated Fat Index

K=Potassium

Greek-Americans compared to the non-Greeks. Non-Greeks had significantly higher sodium ( $p=.008$ ) and calcium-phosphorus ratio ( $p=.0004$ ) intakes compared to the Greek-Americans. Other ethnic group nutrient differences that attained significance at a  $p$ -value less than 1.0 were: total fat intake ( $p=.060$ ) and % calories from fat ( $p=.086$ ) which were lowest for the non-Greek group; cholesterol per 1000 calories ( $p=.083$ ) was lowest for the Greek-Americans and highest for the non-Greeks.

Calorie intakes were lowest for the non-Greek group. However, one-third (33.8%) reported that they consumed less than usual during the 24-hour period before the study. By comparison, only 7.1% of the Greeks and 20.5% of the Greek-Americans reported consumed less than their usual intakes during the 24-hour recall period.

There were significant ethnic ( $F$ -value=3.45,  $p=.035$ ) and gender ( $F$ -value=9.21,  $p=.003$ ) effects on calorie intakes. Gender is more predictive of calorie level than ethnic group.

Slightly more than half (58.3%) of persons in the Greek ethnic group reported that they were following a special diet plan. Thirty-six percent of them followed a diet that was prescribed by a physician. Eighteen percent of them were following a diet for weight control. Of the Greek-American persons who followed a special diet (20.5%), the greatest proportion of the diets were for weight control



(15.2%). Other reported reasons for following a special diet included: physician-prescribed (10.7%) and self-prescribed (3.6%). Reasons given by the proportion of non-Greeks who followed a special diet (31.3%) included: physician-prescribed (12.7%), self-prescribed (4.8%) and weight control (12.7%). The predominant reason given for a self-prescribed diet for persons in the Greek-American and non-Greek ethnic groups was for cholesterol-lowering.

The ethnic group with the highest number of persons who reported taking a multiple vitamin-mineral preparation was the non-Greek group (31.3%) followed by the Greek-Americans (15.4%) and the Greeks (9.1%). Greek-Americans had the highest proportion of persons who were taking special supplements (20.5%). Non-Greek persons (12.5%) also reported use of special supplements while Greeks reported using no special supplements. Special supplement preparations included mixtures and selected combinations of the following: brewer's yeast, lecithin, bran, metamucil, garlic, RNA/DNA, salmon oil, linseed oil, max-EPA, psyllium husk fiber, beta-carotene, and self-prescribed amounts of the B-vitamins, vitamins E and C, calcium, zinc, selenium and chromium.

There was a significant correlation ( $r=.384$ ,  $p=.004$ ) between dietary cholesterol and blood cholesterol levels for the non-Greeks. The higher the cholesterol intake the higher the blood cholesterol.

Differences in the effects of nutrients on blood cholesterol were evident from comparisons among the ethnic groups. Table 4-9 describes these differences. The Greek and Greek-American ethnic groups were combined for these analyses.

Table 4-9: MANOVA of the nutrient relationships with blood cholesterol by ethnic group

NUTRIENTS	PARAMETER ESTIMATE		P-VALUE	
	GR & GA COMBINED (n = 47)	NG (n = 53)	GR & GA COMBINED	NG
INTERCEPT	61.30	-65.75	.519	.541
CALORIES	- 0.09	0.16	.393	.059
CHO, gms	0.26	- 1.13	.658	.045*
PRO, gms	0.62	0.01	.242	.986
FAT, gms	0.15	- 5.29	.712	.010*
SFA, gms	0.79	4.35	.500	.060
MFA, gms	1.32	5.43	.274	.018*
PUFA, gms	0.76	4.93	.581	.022*
K/1000 kcal	- 0.01	- 0.00	.703	.732
NA/1000 kcal	0.09	0.00	.628	.640
chol, mg	0.79	2.46	.276	.008*
CA:Phos	63.42	2.62	.244	.930

\* = significant

CHO = carbohydrate

PRO = protein

SFA = saturated fatty acids

MFA = monounsaturated fatty acids

PUFA = polyunsaturated fatty acids

K = potassium

NA = sodium

chol = cholesterol

CA:Phos = calcium to phosphorus ratio

kcal = calories

A multi-variate analysis of variance (MANOVA) indicated that grams of carbohydrate, fat, polyunsaturated fat and dietary cholesterol had significant partial effects on blood

cholesterol levels for the non-Greeks. Saturated fat had an effect on blood cholesterol levels of the non-Greeks but it was not highly significant in predicting cholesterol values. These nutrients were not significant predictors of the Greek cholesterol levels.

Nutrient differences in the 24-hour recall between the ethnic groups can be explained by their dietary pattern preferences. Greeks and Greek-Americans continue to prefer the use of olive oil (a MFA) and "Greek style" cooking, either at a Greek restaurant or at home. The non-Greeks have reduced their total and saturated fat intakes by substituting low-fat milk for whole milk and eating less high-fat baked goods. Some of the non-Greeks have increased their use of olive oil intake and consume "Greek style" meals on occasion. Their preference for drinking milk (in amounts greater than the Greeks or Greek-Americans) and their consumption of pizza and salad dressings increase their calcium to phosphorus ratios and their sodium intakes.

#### Comparisons with the Greek Diet

The majority of studies concerning the Greek dietary pattern were descriptive and, therefore, were discussed in the food frequency section. Unpublished data from the Cross-Cultural Study of Adolescent Males, aged 16-18 (Kurtz et al. 1982) were used to compare nutrient intakes of the male Greeks in Tarpon Springs with Greek and Greek-American

cohorts in New York City. Table 4-10 describes these comparisons. The younger age group in the 1982 study accounts for the higher calorie intakes. Percents and nutrients per 1000 calories were used to facilitate more equal comparability between the other nutrients.

Table 4-10: Male Greek and Greek-American nutrient comparisons with the cross-cultural study

Nutrient	Greek Study males 25-74 years		Cross-Cultural Study males 16-18 years	
	N	Means	N	Means
Calories				
Greek	5	2304	97	2459
Greek-Am	10	2138	183	2595*
% of calories				
CHO	GR	46.6	GR	50.1
	GA	49.5	GA	48.3
Pro	GR	18.4	GR	14.4
	GA	13.8	GA	15.8
Fat	GR	32.4	GR	35.9
	GA	33.2	GA	37.3
SFA	GR	10.8	GR	15.7*
	GA	9.0	GA	15.4*
MFA	GR	12.2	GR	13.6
	GA	10.9	GA	13.9
per 1000 cal				
Sodium, mg	GR	1396	GR	956*
	GA	1228	GA	891*
Potassium, mg	GR	1618	GR	3037*
	GA	1424	GA	3216*
Chol, mg	GR	118	GR	89
	GA	124	GA	125

\*=significant at less than .05

Studentized t-tests of paired comparisons of means indicated that Greek adolescents in the New York City Cross-Cultural Study did not consume significantly more



calories than the Tarpon Springs Greek males. There was a significant difference in the calorie intakes between the two groups of Greek-Americans.

Saturated fat intakes were significantly lower for the Tarpon Springs Greeks and Greek-Americans. Data for the New York City study were collected in 1980-1982. The differences in saturated fat intake may reflect the trend to decrease saturated fat that has been promoted during the time interval between data collections.

Sodium intakes were significantly lower for the New York City adolescents and potassium intakes were higher. These differences may be real and reflect different food choices between the groups or may be attributable to the use of different data bases for the respective nutrient analyses.

#### Comparisons with the American Diet

Nutrient intakes of the non-Greek ethnic group were compared with available data from NHANES (Abraham et al. 1979; Block et al. 1988) and USDA Studies (CSFII 1985 and 1986). Table 4-11 (p. 111) compares these nutrients.

As observed with the Greek and Greek-American comparisons, Tarpon Springs non-Greeks consumed a significantly lower percent of calories from saturated fat than the samples in NHANES and the USDA. The significantly lower calorie intakes of the Tarpon Springs non-Greeks was primarily due to the lower fat intakes. Cholesterol intakes

Table 4-11: Non-Greek nutrient comparisons with nutrients from national studies

Nutrients	Ages 25-74 years				Ages 19-50 years	
	Non-Greeks	NHANES			USDA	
	S/N	Means	S/N	Means	S/N	Means
Calories						
M	29	1776	3718	2318*	1134	2560*
F	37	1390	5593	1500	1136	1473
Pro, gms						
M		80.3	M	92.1	M	102*
F		61.0	F	61.9	F	61.5
% of calories						
CHO	M	46.2	Not Available		M	45.3
	F	50.0			F	45.9*
Pro	M	18.0	M	16.0	M	15.9
	F	17.9	F	16.5	F	16.7
Fat	M	32.5	M	37.5	M	36.4*
	F	30.2	F	36.9	F	36.7*
SFA	M	11.9	M	13.6*	M	13.2*
	F	9.9	F	12.8*	F	13.4*
MFA	M	11.1	Not Available		M	13.8*
	F	10.4			F	13.5*
PUFA	M	5.4			M	6.8*
	F	5.8			F	7.2*
per 1000 calories						
Na,mg	M	1650			M	1470
	F	1565			F	1586
K,mg	M	1721			M	1351
	F	1885			F	1436
Chol,mg	M	116			M	168
	F	128			F	189
Dietary Fiber,						
gms	M	10.8			M	17.4*
	F	10.8			F	10.8
*=significant at less than .05					S=Sex	
Na=Sodium					N=Number	
K=Potassium					M=Male	
Chol=mgs cholesterol					F=Female	

were also lower for the Tarpon Springs sample. These observations may confirm the health-conscious bias of the study sample.

Monounsaturated and polyunsaturated fats were significantly lower for the sample in Tarpon Springs than for the USDA sample. The significantly higher potassium intakes of the Tarpon Springs non-Greeks may be attributable to greater intakes of fresh fruits and vegetables. The similarity of the dietary fiber intakes of the females and significantly lower intakes of the males suggests that this explanation may not be adequate.

Whether the reported nutrient differences between the non-Greek ethnic group and the national studies is associated with a health-conscious bias of the study group or indicative of secular trends since 1986 cannot be determined by this study. The Surgeon General's Report (1988) spawned publicity for the associations between diet and several diseases. The National Cholesterol Education Program (NHLBI AND HHS 1988) raised the consciousness of the public to large scale reduction of cholesterol values by reducing intakes of fat, especially saturated fats and dietary cholesterol. Food companies used the media and advertising promotions to tout cholesterol-lowering products. NHANES is currently collecting dietary data for an up-dated national study (personal communication 1988). When data from this study are available, these nutrient differences can be further compared for the effect of time on the reduced fat, saturated fat and cholesterol intakes of the non-Greeks in Tarpon Springs.

## Risk Factors for CHD

### Medical History

Part I of the questionnaire elicited information concerning the participant's history of chronic diseases. Table 4-12 (p. 114) describes the proportion of persons in each ethnic group who were taking medications and, if so, what kind. The second part of the table describes whether they, their parents, or their children had ever been told that they had a disease and, if so, which chronic disease.

A higher proportion of the non-Greeks reported having a parent with a diagnosis of heart disease. This trend, however, did not attain significance.

### Exercise Practices

Study participants were asked about the kinds of activity that they experienced at their work or while going about the day. Another question asked about their exercise program--whether they seldom exercised vigorously or had a regular scheduled exercise program. Table 4-13 ( p. 114) summarizes their responses.

Greeks reported more activity while going about their work and day and seldom participated in a regular exercise program. Approximately one-third of the Greek-Americans and non-Greeks had sitting jobs or sat most of the day. A higher proportion of the non-Greeks (23.9%), compared to the Greek-Americans (10.0%) followed a regular exercise program at least 3 times a week.



Table 4-12: Frequency of medication use and chronic diseases by ethnic group

% Take Medications yes HBP Card Diab					% Have Chronic Disease person CA Diab Heart BP Stroke					
GR	44.4	27.8	27.8	11.1	self	5.6	22.2	33.3	33.0	0.0
					parent	22.2	16.7	22.2	5.6	0.0
					child	0.0	5.6	0.0	5.6	0.0
GA	32.5	10.0	7.5	0.0	self	7.3	2.4	12.2	19.5	0.0
					parent	38.5	17.9	23.1	59.0	10.3
					child	0.0	5.1	5.1	7.7	0.0
NG	47.1	26.5	2.9	7.4	self	7.4	8.8	4.4	35.3	5.8
					parent	25.0	8.8	39.7	38.2	11.8
					child	2.9	0.0	1.5	2.9	0.0

GR=Greek  
 GA=Greek-American  
 NG=non-Greek  
 N=22GR; 44GA; 70NG  
 HBP=High blood pressure medication  
 Card=Cardiac medication  
 Diab=Diabetes medication  
 CA=Cancer; Diab=Diabetes;  
 Heart=Heart Disease;  
 BP=High Blood Pressure  
 Note: Medications not listed in the table included:  
 aspirin and other analgesics, oral contraceptives  
 and allergy medications.

Table 4-13: Frequencies of activity and exercise practices by ethnic group

	Greek % N= 22	Greek-American % 44	Non-Greek % 70
Activity (Work or Daily)			
Sit	16.7	30.0	32.4
Stand	38.9	25.0	10.3
Walk	22.2	25.0	33.8
Labor	0.0	2.5	2.9
Exercise Program			
Seldom	55.6	30.0	28.4
Less than 1/wk	0.0	35.0	17.9
3 times/wk	11.1	10.0	23.9
5 or more/wk	5.6	12.5	13.4

### Smoking

All persons who reported that they smoked indicated that they smoked cigarettes rather than a cigar or pipe. Table 4-14 summarizes their smoking patterns by ethnic group.

Table 4-14: Frequencies of smoking practices by ethnic group

	Greek % N= 22	Greek-American % 44	Non-Greek % 70
Smoke Cigarettes	5.6	9.8	30.9
Daily Amounts			
Less than 1/2 pk	0.0	0.0	4.4
1/2-1 pack	0.0	2.4	11.8
1-2 packs	5.6	4.9	11.8
2 or more packs	0.0	2.4	2.9

A greater proportion of non-Greeks smoked compared to the Greeks or Greek-Americans. Of the non-Greeks who smoked, half of them smoked more cigarettes per day than the proportion of Greeks or Greek-Americans who smoked. A large proportion of persons in all three ethnic groups did not smoke. There was a trend toward higher diastolic blood pressure with increased packs of cigarettes smoked. Mean diastolic pressure was 76.6 mm for persons who smoked less than one-half pack per day and 88.7 mm for persons who smoked 2 or more packs of cigarettes per day.

### Body Mass Index

Body mass index (BMI) was computed and defined according to criteria used in NHANES (1987). Table 4-15

compares the BMI classifications for the three ethnic groups.

Table 4-15: Body mass index classifications by ethnic group and gender

Ethnic Group/Gender				%	%	%
	N	Mean	Range	Normal	Overweight	Obese
GR	22	30.71	22.65-45.80			
	Male (N=5)			35.0	45.0	20.0
	Female (N=17)			40.0	35.6	24.4
GA	44	28.05	18.25-39.35			
	Male (N=12)			33.3	16.7	50.0
	Female (N=32)			51.4	27.0	21.6
NG	70	26.91	18.22-44.27			
	Male (N=30)			58.1	20.9	20.9
	Female (N=40)			70.5	18.0	11.5

Non-Greeks had the highest proportion of persons in the normal BMI classification. More Greek-American women were in the normal classification while more of the men were in the obese category. Greeks had a slightly higher proportion of males in the overweight classification and females in the normal category.

Tukey's Studentized Range Test indicated that the BMI was significantly higher (less than .05) for Greeks than for non-Greeks (GLM  $p=.0138$ ). An analysis of variance showed a significant effect of age ( $p=.0003$ ) on BMI. Ethnic group and age had an interactive effect on BMI ( $p=.0032$ ). Mean BMI for the Greek-Americans was not significantly different from either the Greek or non-Greek BMI means, suggesting that the interactions of age and ethnic group are more

predictive of Greek and non-Greek BMIs. The ethnic religion score had a significant effect ( $p=.008$ ) on BMI. As the religion score decreases (showing greater identity with the Greek religion), the likelihood of finding a higher BMI increases.

As expected, Pearson's correlation coefficients revealed a significant positive correlation between calories and BMI ( $r=.229$ ,  $p=.01$ ). The higher the reported calorie intakes, the higher the BMI.

### Blood Pressure

Blood pressure values are described in Table 4-16 by ethnic group, gender and age group.

Table 4-16: Systolic and diastolic blood pressure values by ethnic group, gender and age group

Ethnic Group	N	Systolic Mean mm	Range	Diastolic Mean mm	Range
Greek	22	132.4	101-169	79.0	49-106
Greek-American	44	125.0	90-151	77.1	60-99
Non-Greek	70	131.8	95-176	80.5	58-104

	25-49 years			50-74 years		
	N	Systolic mm	Diastolic mm	N	Systolic mm	Diastolic mm
Male						
GR	1	101.0	56.0	4	146.5	91.5
GA	8	134.5	82.4	4	134.3	80.3
NG	14	125.3	80.0	16	139.3	83.9
Female						
GR	8	119.1	78.5	9	141.3	76.3
GA	23	118.2	74.4	9	129.7	77.8
NG	23	139.3	83.9	17	144.8	80.2

GR=Greek

GA=Greek-American

NG=Non-Greek



A MANOVA indicated that age group had the highest significant effect on systolic blood pressure ( $p=.0001$ ) and on diastolic pressure ( $p=.0175$ ). When controlling for age, ethnic group was also significant ( $p=.0399$ ). When controlling for age, gender was significant at the .0388 level. Controlling for age group and gender showed the diastolic pressures to be significantly different between ethnic groups ( $p=.0239$ ). Socioeconomic status had no significant effect on systolic ( $p=.5749$ ) or diastolic ( $p=.4440$ ) blood pressures. Pearson's correlation coefficients showed that the dietary calcium to phosphorus ratio had an inverse relationship on the systolic ( $r=-.345$ ,  $p=.005$ ) and diastolic ( $r=-.400$ ,  $p=.001$ ) readings of only the non-Greek group. The higher the calcium to phosphorus ratio, the lower the systolic and diastolic pressures of the non-Greek group in Tarpon Springs. Neither sodium nor potassium intakes, for any of the three ethnic groups, had a significant effect on the systolic or diastolic blood pressures.

Low calcium to phosphorus ratios for the non-Greeks agree in part with the NHANES findings reported by McCarron et al. (1984). Higher intakes of calcium, potassium and sodium for the NHANES sample were associated with lower mean systolic blood pressure and lower absolute risk of hypertension.

## Cholesterol

Table 4-17 describes the differences in blood cholesterol values by ethnic group, gender and age group.

Table 4-17: Blood cholesterol by ethnic group, gender and age group

	N	Blood Cholesterol Means mg/dl	
		25-49 years	50-74 years
Greek			
Male	1	208.0	189.5
Female	8	213.5	251.9
Greek-American			
Male	8	184.6	219.3
Female	23	190.7	225.6
Non-Greek			
Male	14	195.4	205.4
Female	23	223.4	254.3

Tukey's Studentized Range Test indicated that the difference in cholesterol means between the non-Greeks and Greek-Americans was significant with a confidence level of .95 or greater. While the mean cholesterol value for the Greek ethnic group was lower than the non-Greek value, it did not attain significance.

Because cholesterol was the measure used to describe the risk factor status associated with dietary change, it was the dependent variable against which the independent variables were tested. Age, before grouping into two groups, had a significant effect ( $p=.0046$ ) on cholesterol values. After grouping the ages into a younger and older group to facilitate larger cell sizes for multiple

regression analyses, the difference was less clearly significant ( $p=.0918$ ). Gender had a significant effect ( $p=.04$ ) on cholesterol values. Women had higher cholesterol values than men in each of the age and ethnic group categories. This was an unexpected finding, especially in the younger age groups. Analyzing the HDL and LDL cholesterol fractions could identify whether the higher cholesterol values might be attributable to higher HDL levels. Socioeconomic status did not have a significant effect ( $p=.53$ ) on cholesterol.

Pearson's correlation coefficients showed an inverse association ( $r=-.593$ ,  $p=.0096$ ) with religion and cholesterol for the Greek ethnic group only. The greater the identity with the Greek religion (a lower religion score), the higher the cholesterol value. Age had an inverse relationship ( $r=-.609$ ,  $p=.0073$ ) with religion. The higher the age, the lower the religion score (greater identity with religion). Controlling for age in the Greek ethnic group, negated the effect of religion on blood cholesterol values.

The culture score had a significant association with cholesterol ( $r=-.506$ ,  $p=.032$ ) for the Greek ethnic group. As the culture score decreased (more ethnic group cohesion), the cholesterol level increased. Age, as with religion, had a significant effect on the culture score ( $r=-.478$ ,  $p=.04$ ). This relationship was not significant for the Greek-Americans or non-Greeks.

When the Greek and Greek-American ethnic groups were combined, in order to have more comparable and larger numbers for the Greek and non-Greek comparisons, fasting had a significant association with cholesterol ( $r=-.417$ ,  $p=.06$ ). The Greeks and Greek-Americans who practiced fasting frequently had higher cholesterol levels. Age also influenced this relationship. This effect was not observed with the non-Greeks ( $r=.08$ ,  $p=.66$ ).

The factor analysis, described in the Eating Preference Section (page 79), had a loading on three factors with low explanatory power. These factors (Factor 1: Ethnicity Factor, Factor 2: Medical Factor and Factor 3: Commercial Factor) were analyzed with cholesterol as a dependent variable in a multiple regression. The Medical Factor, which had loadings on age, systolic blood pressure, medication for high blood pressure and a diagnosis of high blood pressure and cancer, had a significant effect ( $p=.015$ ) on cholesterol. Together, these variables were good predictors of an elevated cholesterol.

To test whether Greek food preferences or technological influences had a health effect, e.g., increased blood cholesterol, the averaged mean scores for each of the variables that defined Greek food preferences, non-Greek food preferences, convenience influences and commercial influences respectively were tested in a multivariate



analysis by ethnic group. Table 4-18 describes these relationships.

Table 4-18: Infrastructural and structural food preferences on blood cholesterol levels

Variable N=	Parameter Estimate		p-value	
	GR 11	GA 37	GR	GA
Intercept	79.09	320.32	0.68	0.00
GR Preference	7.14	- 1.05	0.21	0.50
NG Preference	-12.79	- 2.97	0.37	0.36
Convenience	- 0.32	5.61	0.97	0.01*
Commercial	8.66	-17.75	0.36	0.00*
N=	GR/GA 49	NG 53	GR/GA	NG
Intercept	250.57	160.22	0.00	0.00
GR Preference	- 0.58	1.29	0.71	0.39
NG Preference	- 1.62	- 0.74	0.62	0.85
Convenience	3.78	2.76	0.08	0.21
Commercial	- 9.15	- 2.53	0.02*	0.40

\*=significant

GR=Greek

GA=Greek-American

NG=Non-Greek

Commercial influences had a significant effect on blood cholesterol levels of the Greek-Americans. The greater the influence of TV advertisement, coupons and magazine recipes on food purchases, the higher the blood cholesterols. Convenience had a weak significant ( $p=.0083$ ) partial effect on food patterns among the Greek-Americans. This relationship was only significant when controlling for the other variables in the MANOVA. The trend suggests that persons in the Greek-American ethnic group who are more

highly influenced by convenience, e.g., eat more frequently at fast food restaurants, use convenience foods for preparing foods at home and use a microwave oven for food preparation may have lower cholesterol values. These effects were not significant for either the Greek or non-Greek ethnic groups. When the Greek and Greek-American groups were combined to increase the number of persons per cell in further multiple variate analyses, the commercial influence ( $p=.0239$ ) was still apparent. The partial effect of the convenience influence weakened ( $p=.0811$ ), possibly because age ranges were more comparable between the two ethnic groups. Neither a preference for Greek nor non-Greek food patterns influenced the blood cholesterol values of the three ethnic groups.

To further test which variables were the best predictors of cholesterol levels, a maximum R-square stepwise regression was performed with all the study variables and two ethnic groups (Greeks and Greek-Americans were combined into one Greek group). Table 4-19 (p. 124) describes these models.

The best predictive model for the Greek group cholesterol values included the age and commercial variables. Age had a positive effect. The higher the age, the greater the cholesterol value. The commercial variable (purchasing foods and beverages advertised on TV, use of coupons for grocery purchases and use of recipes seen in

Table 4-19: Maximum R-square improvement for the dependent blood cholesterol value

Greeks and Greek-Americans Combined N=45			
Variables	B-value	p-value	R-square
Intercept	162.32		
Age	14.79	.0002	29
Commercial	- 5.58	.0419	35
CA:Phos	49.39	.1334	39
Non-Greeks N=52			
Intercept	272.77		
Activity	-19.47	.0005	10
Diagnosis 1	-59.20	.0004	21
Age	10.26	.0172	31
Heart 1	16.93	.0813	35
Diagnosis 1=Self-report of Chronic Disease Diagnosis			
Heart 1=Self-report of Heart Disease Diagnosis			
CA:Phos=Calcium to Phosphorus Ratio			

popular magazines) influenced cholesterol in a higher direction. The greater the commercial influence, the higher the blood cholesterol values. While not having a significant effect, the variable with the next greatest influence was the calcium to phosphorus ratio. This variable explained 10% of the blood cholesterol variance among the Greek ethnic group. The higher the calcium to phosphorus ratio, the higher the cholesterol values.

The best predictive model for the non-Greeks included the age and activity variables. The greater the age, the higher the cholesterol values. The more active a person is

in their daily activities and work, e.g., walks rather than sits, the lower the cholesterol level. The absence of a chronic disease had an inverse relationship with cholesterol. No chronic disease diagnosis is associated with lower cholesterol values in the non-Greek ethnic group. A diagnosis of heart disease had a slightly significant effect that explained an additional 4% of the variance in cholesterol levels of the non-Greek group.

From a biological perspective, increasing age was a predictor of increasing blood cholesterol levels for both the Greek and non-Greek groups. Technological influences, especially commercial influences rather than a preference for Greek food patterns, had the greatest influence in increasing blood cholesterol levels among the Greek group. The effect of daily activities which were more physically demanding and the absence of a chronic disease diagnosis had the greatest effect on decreasing blood cholesterol values among non-Greeks. While not previously considered a risk factor for CHD, daily activities that are more physically demanding (jobs that require manual labor) may have a similar cardiovascular effect as regular exercise in reducing cholesterol levels. Further studies would be needed to see whether this cholesterol-reducing effect is associated with reduced levels of HDL, in contrast to the effect of regular scheduled exercise which increases HDL cholesterol (Lamon-Fava, et al 1989). The relationship of persons with



no known diagnosis of a chronic disease and lower cholesterol levels suggests that attempts to reduce cholesterol values may be effective in reducing a high cholesterol value but not to the level achievable before the onset of the disease.

## CHAPTER 5

### DISCUSSION

In order to analyze the changes in dietary behaviors of Greeks and Greek-Americans in Tarpon Springs, it is necessary to describe the historical changes that altered the role of the ethnic group within the community. The original Greek settlement was unique, compared to Greek settlements elsewhere in the United States, because Greeks did not just represent an enclave within a larger community. They were the majority population and dominant ethnic identity in the community from the early 1900s until the end of World War II (Bernard 1987 and Moskos 1989). The precipitous decline of the sponge industry caused the economic advantage of the Greek influence to change. They gradually became part of the tourist economy, which is the dominant influence today. Ethnic symbols, remnants of a prosperous way of life for Greeks in Tarpon Springs, are now displayed like trophies for curious non-Greeks and tourists to view.

Greek immigration patterns to the United States have also changed the characteristics of the Greek ethnic group in Tarpon Springs. While a core of original settlers are still prominent within the Greek community, newer arrivals from Greece, generations of Greek-Americans and Greek

retirees from the northern states have increased the diversity within the Greek community. While obviously aware of their differences, they share pride in the time-enduring ethnic markers, e.g., the church, Greek family restaurants and other businesses, such as the curio shops and sponge diving, that are visible reminders of the common ethnic heritage that they share.

The Greek ethnic group in the study contains representative persons from each of the subgroups of Greeks who live in the Tarpon Springs area. Three-fourths of the Greek group are from the island of Kalymnos, home of the founders of this Greek community.

#### Adaptive Pressures on Food Use

The climate in Tarpon Springs is similar to coastal areas of Greece. Fresh fish, fruits and vegetables are foods that are available throughout the year in Greece and in Tarpon Springs. In highland areas of Greece, vendors sell fresh produce in weekly street markets. In addition to the continuity of ethnic practices that were part of the original Greek settlement in Tarpon Springs, a great variety of familiar foods were available for consumption compared to other areas in the northern United States where some Greeks settled. Diet changes, therefore, were not an adaptive necessity for Tarpon Springs Greeks in the early to mid-1900s. Pressures to change the diet may be felt more

acutely since their numbers have diminished in proportion to the increasing population of non-Greeks in the community.

Informal conversations with Greek physicians and health care employees during the period of participant observation suggested that Greeks in Tarpon Springs, compared to Greeks in Greece, are overweight and more prone to diseases associated with overindulgence, e.g., diabetes and hypertension. These implications suggest that the Tarpon Springs Greeks consumed the same or additional amounts of calories and participated in less activity and exercise than Greeks in Greece. Callers to the radio talk show, when I was a guest, confirmed these observations. Increased food consumption, in this situation, was an expression of the economic advantage that the Greek immigrants realized in their new setting.

### Ethnic Change

An overriding motivation for Greek migration to the United States, in the early 1900s, was for economic gain. The prevailing intention was to return to Greece with sufficient capital to enjoy a comfortable life (Moskos 1989). Because the Greek Orthodox Church embodied Greek historical, cultural, social and religious experiences for Greeks in Greece, the Greek settlers established Saint Nicholas Greek Orthodox Church in Tarpon Springs to foster the link with their ethnicity and homeland. Acculturation pressures, therefore, exerted little influence on Tarpon



Springs Greeks, as compared with Greek immigrants in other United States settlements, because they did not look to the larger society for social acceptance. Among the Greeks who participated in the study, attitudes toward Greek cultural, religious and national identity still are strong, as evidenced by their low scores on the Ethnic Culture Questionnaire subscores. Compared to ethnic group attitudes studied by Roche (1984), Greeks in Tarpon Springs have maintained stronger ethnic identities than Italian immigrants in Rhode Island.

While mean scores for each subscale were higher for Greek-Americans than for Greeks, the range of scores indicate that some Greek-Americans have stronger ethnic attitudes than some Greeks (ranges of scores on the subscales consistently overlapped). The national subscale had the least overlap and higher mean subscale score for the Greek-Americans, suggesting that the Greek traditions, language, music, history and religion are more important to them than the sense of peoplehood shared by living in a Greek neighborhood, not changing one's name, feeling a duty to help a fellow ethnic or vote for a candidate of the same ethnic background. This finding confirms Moskos' observation (1989) that acculturation appears to lag behind assimilation in Greek communities. There was no linear pattern of a diminishing ethnic identity as generations became more removed from Greece.

The differences in how individuals viewed the role of family, place within the family hierarchy and role in transmitting the Greek culture to children were evident in how they answered questions on the questionnaire. For example, one Greek female, who chose the Greek translation of the questionnaire and answered the questions in Greek, responded to the question inquiring about whether any members of her household are non-Greek by stating that a son-in-law and daughter-in-law are American. Most of the study participants interpreted the term "household" to mean "living under the same roof." The concept of family or household, in Greece includes the extended family. Her response to the question revealed the Greek concept of household that she still holds. By contrast, a Greek-American male not only indicated that his wife was American but stated that his children are also American. A Greek-American male, who is married to a non-Greek wife, reported that he strongly agrees that children should be taught the Greek language and learn Greek dances and music. However, a Greek-American female, who was married to a non-Greek husband, showed less preference for instilling Greek traditions and practices in her children but expressed strong agreement with personal attitudes about Greek cultural practices. While the latter pair of examples may merely reflect individual preferences, they do illustrate the role Greek husbands feel in asserting moral authority

within the household and the wife's attitude of acceptance of the husband's role.

The higher mean score for the Greek-Americans on the ethnic subscales, compared to the means for Greeks, imply that Greek-Americans have been incorporated into a larger social circle than the Greeks. The social ties for Greek-Americans include more ties with non-Greeks, but this wider network does not exclude ties with Greeks, especially for the sharing of cultural and religious practices.

#### Eating Preferences and Dietary Changes

A core of Greek persons in the Greek ethnic group showed a strong preference for Greek foods and dietary patterns. The Greek persons did not yield to the purchase of products promoting convenience and time-saving features but rather adapted to conveniences within the Greek lifestyle, e.g., eating frequently at Greek restaurants, as a way of adapting to the emphasis on time and convenience in the American culture.

As with their attitudes toward ethnic ties, Greek-Americans incorporated a wider range of food preferences into their food choices. They participated in Greek food use patterns but also assimilated some of the American food practices into their dietary behaviors. Acculturation, as observed by Moskos (1989) and Costantakos (1987), did not involve a shedding of Greek dietary practices, but rather included a larger entree of possible

food choices, e.g., the custom of preparing special foods to celebrate holiday occasions. This practice continued for Greek-Americans and included Greek and American holiday celebrations. The objects of convenience and time-saving, e.g., foods from fast food restaurants, convenience foods for home preparation and a microwave oven were incorporated into the food use patterns of the Greek-Americans but not to the extent to which the non-Greeks used them.

The technological influence that was most influential in increasing blood cholesterol levels for the Greeks, especially the Greek-Americans, was the commercial influence. Media that entered the home, i.e., TV commercials, newspaper coupons and recipes from popular magazines, had the greatest impact on those dietary changes which increased blood cholesterol values. Overall, however, cholesterol levels for Greek-Americans were significantly lower than for non-Greeks.

For the non-Greeks, age and a sedentary lifestyle were associated with an increased cholesterol level. The absence of a chronic disease diagnosis was predictive of lower cholesterol values. The 24-hour recall indicated that the non-Greek group had reduced their total fat and dietary levels in keeping with the Surgeon General's recommendations (1988). Commercial influences among the non-Greeks were not significant in decreasing their blood cholesterol levels.



Informal conversations with persons who attended the cholesterol screening where study participants were recruited suggested that the non-Greeks had social networks for transmitting and comparing information about reducing risk of chronic diseases. Further studies are needed to investigate the social networks among the non-Greeks to determine whether this is the vehicle used for transmitting health promotion information.

#### Dietary Changes and CHD Risk Factor Status

Like their counterparts in coastal areas of Greece, the Greeks in Tarpon Springs who participated in the study continued to prefer fish to meat, fresh vegetable salads and fruits, Greek pastries, Greek coffee and olive oil, especially for salad dressing.

Overall quantities of food consumed, as evidenced by the mean calorie intake for the Greek ethnic group, were high. As observed by the Greek physicians and health care workers in Tarpon Springs, the Greeks tended to be overweight and one-third of them reported having a chronic disease diagnosis.

Like the Greeks in Greece, monounsaturated fats (total gram intake and percent of calories) continue to be high among the Greek study population in Tarpon Springs. There was a significant difference in the amounts of monounsaturated fats in the Greek and Greek-American diets, compared with the monounsaturated fat intakes of non-Greeks.

Total fat intake, however, for the non-Greeks, was lower than for the Greeks or Greek-Americans. Monounsaturated fats did not have a significant effect on the cholesterol levels for the Greek or Greek-Americans. Variations in blood cholesterol for the non-Greeks could be partially explained by the monounsaturated and polyunsaturated fats, total fat, carbohydrates and dietary cholesterol.

These findings suggest that nutrients exert varying degrees of influence on cholesterol values of differing populations. McMurray et al. (1985) observed metabolic differences in how the Tarahumara Indians of Mexico absorbed dietary cholesterol when given a challenge diet containing high cholesterol foods. They were observed to have a higher total sterol turnover primarily because of an increased bile acid output compared to when they ingested a cholesterol-free diet. Cholesterol absorption has been reported to be higher for US Americans and Australians than for populations, such as the Tarahumara Indians, who traditionally consume low cholesterol diets.

The Greek diet, consisting of high intakes of monounsaturated fats, n-3 fatty acids and dietary fiber with low saturated fats and cholesterol, may metabolically adapt Greeks to decreased CHD risk. If the diet is not greatly altered to incorporate high intakes of saturated fats and cholesterol for long periods of time, cholesterol absorption may remain low for Greek immigrants and Greek-Americans. By

contrast, non-Greeks in the United States have been consuming high intakes of saturated fats and cholesterol for numbers of years, as noted in the Surgeon General's Report (DHHS 1988), by Keys (1980) and by Neville (1990). These metabolic differences in cholesterol absorption and turnover rates may explain the significant differences in cholesterol levels between the Greeks and non-Greeks in Tarpon Springs, rather than the presence of varying amounts of these nutrients in their reported diets.

While this study suggests that 30-35% of calories from fat may be acceptable for keeping cholesterol within desirable ranges, if the predominant fat is monounsaturated, it cannot be conclusively stated because of the study limitations. The sample is non-random. If the non-Greeks are a health-conscious group, as the low percent of fat (31%) in their diets suggest, then their cholesterol values may be lower than cholesterol values of non-Greeks in general. The significant difference between their cholesterols and the NHANES sample confirms this assumption. Time could be another explanatory factor. This study is cross-sectional and used national survey data to 1986 as a proxy for time. If the non-Greeks reduced their saturated fat and dietary cholesterol intakes within the past three years compared to a lifetime high intake of monounsaturated fat intakes for the Greeks, then time may be a significant factor in relation to how soon this dietary change is



exhibited in lowered cholesterol values. Greek-Americans had more persons in the younger age group (22.79% Greek-Americans were 25-49 years of age and 9.56% were 50-74 years; 27.21% non-Greeks were 25-49 years of age and 24.26% were 50-74 years of age). This sample bias may account for some of the differences between the Greek-American and non-Greek mean cholesterols (increasing age was significantly associated with cholesterol levels for the three ethnic groups). Further studies are needed to differentiate between ethnic groups of comparable age, who consume varying amounts of total fat, saturated fat, monounsaturated fat and dietary cholesterol for a specified time period before the role of these lipids and the metabolic adaptation of a population in the cholesterol-lowering equation can be fully elucidated.

#### BMI and Blood Pressure

Higher age among the Greek group compared to the Greek-Americans was associated with increased weight (BMI) and both increased systolic and diastolic blood pressures. Low intakes of calcium may explain the increase in systolic pressures among the Greeks. Cholesterol levels for the Greeks were slightly lower (but not significantly different) than the non-Greek mean cholesterol levels suggesting that an increased BMI and elevated blood pressures were greater predictors of CHD risk for the Greeks than the dietary fats or cholesterol. For the non-Greeks in this study, diet



influenced blood pressure. A low calcium to phosphorus ratio was observed to have an increasing effect on both the systolic and diastolic pressures.

#### Other Risk Factors

Other factors that may affect risk factor status include: smoking, activity/exercise and medical history. An increased BMI is not an explanatory variable for the increased blood pressures and cholesterol values for the non-Greeks because persons in the non-Greek group had the highest proportion of persons in the normal BMI category.

#### Smoking

A higher proportion of non-Greeks (30.9%) smoke cigarettes. Half of the persons who smoked, smoked more than one pack of cigarettes a day. An increase in the number of cigarette packs smoked was associated with higher diastolic blood pressures.

#### Activity/Exercise

A sedentary job and daily activities that required little physical exertion were strong predictors of increased cholesterol values for the non-Greek group. The higher proportion of non-Greeks who participate in regular exercise three or more times a week (24% non-Greek; 10% Greek-American; 11% Greek) may explain their lower body weights (BMI).

### Medical History

Compared with the Greeks and Greek-Americans, a higher proportion of non-Greeks had parents who had a diagnosis of CHD. The absence of a chronic disease among the non-Greek sample was predictive of lower cholesterol values. A diagnosis of heart disease explained a portion of the increased cholesterol levels. While dietary reductions of fat, saturated fat and cholesterol may decrease elevated cholesterol levels, low intakes of these nutrients before the onset of disease may have a greater influence on low cholesterol values and prevention of CHD among non-Greeks.

### Mortality from CHD in Tarpon Springs

The mortality rate from CHD in Tarpon Springs in 1987 was 240:100,000 (HRS 1987). This mortality rate is not age-adjusted so that the high proportion of persons aged 65 years and older (28%, UF Bulletin No. 89-90, 1989) accounts for the higher rate, relative to areas with a lower mean population age. This rate does suggest, however, that the mortality rate for CHD in Tarpon Springs more nearly resembles the age-adjusted United States mortality rate for CHD (229:100,000) than the age-adjusted CHD mortality rate in Greece (85:100,000; WHO 1986). How many of the persons in the Tarpon Springs CHD mortality statistics were Greek versus non-Greek could not be determined. The higher cholesterol levels for the non-Greeks in Tarpon Springs compared to cholesterol levels for the Greeks and the higher

proportion of the population who are non-Greek would suggest that persons represented in the mortality statistics may be non-Greek.

#### Implications for Nutrition Intervention Programs

The study findings support the hypothesis that technological influences, rather than infrastructural influences, are better predictors of dietary changes among an ethnic population in a highly technical society. The adaptive diet behavior that appeared to be most influential in predicting risk of CHD, as observed by increased cholesterol levels, was the commercial influence among the Greeks, especially the Greek-Americans. Thus, structural processes within the American society had a stronger effect on food behaviors than the ethnic group's infrastructural processes, i.e., cultural practices and religious practices. While the structural and infrastructural influences were not mutually exclusive in their effects on cholesterol values, and risk factor status for CHD, they do offer insights for the design of a nutrition intervention program among Greeks in Tarpon Springs. The stronger commercial influence, that was associated with elevated blood cholesterols among the Greeks, should be an area targeted for intervention. The commercial influence among non-Greeks, however, was not associated with increased blood cholesterol levels. This observation addresses the need to design intervention

programs that are specific to the food behaviors of each target group.

These findings concur with Pelto's observations (1981) that approaches from anthropology can be extremely useful to nutrition educators interested in designing effective intervention programs. By determining the structural and infrastructural influences on dietary change, as interpreted by a cultural ecological analysis, marketing strategies for nutrition programs can be identified. This approach could also be useful for government agencies concerned with the development of dietary guidelines and dietary changes that promote health and prevent disease. Changes in dietary behaviors that are appropriate for specific ethnic population groups could be incorporated into the recommended guidelines.



## CHAPTER 6

### CONCLUSIONS

This study was designed to describe systematic changes in dietary behaviors, observed in a natural experiment, i.e., Greek immigrants and Greek-Americans living in Tarpon Springs, Florida. Greek immigrants and successive generations in the United States were chosen because the population in Greece has a low risk of CHD. By contrast, the United States population has a high mortality rate for CHD. Greek immigrants to the United States have been observed to be adopting American dietary practices in preference to the traditional diet, thus increasing their CHD risk status (Christakis 1981).

The analysis of dietary changes used a cultural ecological approach to examine the ethnic food patterns (infrastructural influences) and technological (structural) influences that were operative in dietary changes and subsequent CHD risk factor status of Greek immigrants, as measured by increasing blood cholesterol levels.

A questionnaire was designed to collect information from Greek, Greek-American and non-Greek ethnic groups about attitudes toward ethnicity, religion and a sense of peoplehood (culture, religion and national subscores).

Questions dealing with preferences for Greek or American dietary practices were operationalized to measure food preferences that reflected ethnic and technological influences on their food use patterns. Food and nutrient intakes were measured in a food frequency check-list and 24-hour recall and compared to the respective Greek and American diets that are described in the literature.

Risk factors for CHD, other than diet, e.g., medical history, smoking, activity/exercise, BMI, blood pressure and blood cholesterol were considered in the description of changes in CHD risk factor status. Blood cholesterol was the dependent variable because it is the measurable risk factor for which diet is an explanatory variable.

The results showed a significant difference in the cholesterol levels of Greek-Americans compared with non-Greeks. Greek-Americans who participated in the study did not show an abandonment of Greek food practices but rather had incorporated a larger selection of food choices into their dietary preferences. Structural factors, e.g., commercial advertisements on TV, newspaper coupons and recipes in popular magazines, showed a strong influence in the direction of increased blood cholesterol values for the Greeks. As hypothesized, a cultural ecological analysis could differentiate adaptive influences that increased the CHD risk status of Greek immigrants in Tarpon Springs. Structural influences were influential in Americanizing the

diet and increasing the cholesterol levels of some Greeks.

Increasing age was a risk factor for the Greeks, Greek-Americans and non-Greeks. Other factors that influenced lower blood cholesterol levels for non-Greeks were an active daily lifestyle that included physical exertion and the absence of a chronic disease diagnosis.

These findings would benefit nutrition educators interested in the design of intervention programs for ethnic populations. Further studies are needed to test whether a cultural ecological approach will identify dietary changes among other ethnic groups who have increased their CHD risk or risk of other chronic diseases. Future studies are needed to also test whether a program design based on addressing structural influences on dietary change would increase compliance among such groups of people who are increasing their blood cholesterol levels and concomitant risk of CHD.

APPENDIX A  
NEWSPAPER ADVERTISEMENT OF STUDY



# Leader

Appendix A

# TODAY

## GREEK NEWS

Page 5

## OFF THE FRONT PORCH

Page 4

## I DISAGREE

Page 4

Saturday, October 8, 1988

Tarpon Springs, Florida / Vol. 84, No.

## Greek Americans sought for research that could relate new diets, heart disease

Greek-Americans living in the Tarpon Springs and Palm Harbor areas have a chance beginning this week to join a research project aimed at finding out whether their American diet puts them at greater risk of heart attack than the diets in Greece.

The study will be conducted by Cora Kurtz, a Ph. D. candidate with the Department of Anthropology at the University of Florida.

Ms. Kurtz will be at St. Nicholas Greek Orthodox Church the morning of Sunday, Oct. 9, and with the help of Chryse Flowers will begin, after services, to obtain names of people agreeable to join the study.

"For those interested persons who will not be at the Sunday service", Ms. Kurtz said, "they may leave their names and a phone number with Zula at the Church", perhaps today.

The purpose of the study, Ms. Kurtz said, is to describe changes in dietary behaviors which occur naturally among a group of people who have emigrated to a new country. "I have chosen to compare the observed dietary changes with risk for coronary heart disease because there are biological markers which can be measured to compare with the reported dietary patterns. These markers are obesity, elevated blood pressure, and elevated serum cholesterol" she explained.

Greeks and Greek-Americans (aged 25-64) were selected for the study because the incidence of coronary heart disease among this age group in Greece is low compared with a comparable U.S. population. Heart disease is the number one cause of death among adults in the U.S. According to a study by Keys (1980), the death rate for heart disease among American males is six times higher than among a similar group of Greek males.

Greeks who emigrate to the U.S., however, have increased their risk to rates similar to those for Americans. Changes in dietary behaviors have been implicated as one of the factors which contribute to this increased risk of coronary heart disease, a study has shown.

A control group of non-Greeks in Tarpon Springs (aged 25-64 years) will also be studied, Ms. Kurtz said. Dietary behaviors and the biological markers of the non-Greek will be compared with data from the Greeks and Greek-Americans in order to contrast

differences and similarities in dietary behaviors among the study groups.

Ms. Kurtz said the following people will benefit from this study:

Individuals who participate in the study will learn about their own risk factors for coronary heart disease by knowing their blood pressure reading and serum cholesterol values.

Greeks and Greek-Americans who live in Tarpon Springs will find out if they have changed their dietary behaviors in the direction of increased risk for coronary heart disease. When study findings are compared with other studies of Greek immigrants in the U.S., the study will contribute to a more complete picture of heart disease risk of Greek and Greek-American communities in the U.S.

Nutritionists and other health professionals will learn about influences in the Tarpon Springs community which were most likely to be effective in naturally changing the dietary behaviors of Greeks and

See DIET, page 4

### Palm Harbor Middle School 'Open House' is scheduled

'Open House' to give parents an acquaintance with their children's daily class routine is scheduled by Palm Harbor Middle School of Monday, October 10.

The school is on SR 584 at the intersection of CR 39. It said the activities will be available, the school added. It asks that all parents join it for the get acquainted opportunity.

### DIET

from page 1

Greek-Americans. This knowledge will be helpful in the designing of nutrition and health education programs which promote dietary changes that decrease risk for coronary heart disease and other chronic diseases, Ms. Kurtz said.

## APPENDIX B

### NUTRITIONAL ANTHROPOLOGY QUESTIONNAIRE

This questionnaire is designed so that your answers will describe your lifestyle characteristics, cultural opinions, and food preferences. Your responses to the questions will provide valuable information that can help to sort out patterns associated with either an increased or decreased risk for heart disease. Please read each question carefully and mark the answer that best describes you, your opinions, and your preferences. Thank you for your participation in this study.

**PART I** Directions: Please answer with an appropriate number or X in the space which best describes you.

I.D. Number _____	Date _____
Study site _____	Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female
Age range _____	Education: <input type="checkbox"/> Six years or less
_____ 25-29 years	( X one) <input type="checkbox"/> 7-10 years
_____ 30-39 years	Highest <input type="checkbox"/> High School graduate
_____ 40-49 years	Completed) <input type="checkbox"/> AA Degree
_____ 50-59 years	<input type="checkbox"/> Some college but no
_____ 60-64 years	<input type="checkbox"/> degree
	<input type="checkbox"/> BA/BS Degree
	<input type="checkbox"/> MA/MS Degree
	<input type="checkbox"/> MD/PhD/EdD Degree

**Ethnicity**  
 \_\_\_\_\_ Greek (Born in Greece). Please specify location of birth.

\_\_\_\_\_ Years living in U.S. (if born in Greece) \_\_\_\_\_ years  
 or  
 \_\_\_\_\_ Greek-American (Born in the U.S. of  
 \_\_\_\_\_ two Greek parents  
 or  
 \_\_\_\_\_ one Greek parent). Please specify ethnic origin of  
 parent who is non-Greek. \_\_\_\_\_

**Household**  
 \_\_\_\_\_ Number of persons living in household.  
 \_\_\_\_\_ You are the...  
     \_\_\_\_\_ Husband ☐ Friend  
     \_\_\_\_\_ Wife ☐ Uncle  
     \_\_\_\_\_ Son ☐ Aunt  
     \_\_\_\_\_ Daughter ☐ Other relative or in-law  
     \_\_\_\_\_ Single Head of Household  
     \_\_\_\_\_ Grandfather  
     \_\_\_\_\_ Grandmother  
 \_\_\_\_\_ Number of persons living in household who are non-Greek.  
 \_\_\_\_\_ Please specify nationality and relationship to you. \_\_\_\_\_

I.D. Number \_\_\_\_\_

PART I  
Page Two

\_\_\_\_ Number of persons in household who are students.

- \_\_\_\_ Preschool
- \_\_\_\_ Kindergarten
- \_\_\_\_ Elementary school
- \_\_\_\_ Middle school
- \_\_\_\_ High school
- \_\_\_\_ Community College or University

\_\_\_\_ Number of years you lived in Tarpon Springs. Please specify previous location, if you lived in Tarpon Springs less than five years. \_\_\_\_\_

\_\_\_\_ Number of times you visited Greece in the last 5 years, if Greek or Greek-American.

## Employment

\_\_\_\_ Number of persons in household who are employed.

- \_\_\_\_ Part-time
- \_\_\_\_ Full-time

Where do you work?

- \_\_\_\_ Multinational corporation (such as: large bank), federal government
- \_\_\_\_ State government, hospital, public school, large regional corporation, franchise operation, large law firm
- \_\_\_\_ Local business establishment employing more than 20 people (such as: sponge diving, tourist industry, large restaurant).
- \_\_\_\_ Small retail establishment employing less than 20 people (such as: gas station, small restaurant, travel agency, plumber, electrician).
- \_\_\_\_ or, are you...
- \_\_\_\_ Self-employed
- \_\_\_\_ Homemaker
- \_\_\_\_ Full-time student
- \_\_\_\_ Unemployed
- \_\_\_\_ Retired
- \_\_\_\_ Other. Please specify. \_\_\_\_\_

\_\_\_\_ Number of years worked at present employment.

Please specify reason for changing jobs, if in present position less than 2 years \_\_\_\_\_

Please answer the following questions about your present position (or past position, if currently not employed)

Position Title: \_\_\_\_\_

How much choice do you have in the hours that you work, breaks, order of tasks performed, or the way you do your work?

- \_\_\_\_ No choice
- \_\_\_\_ Some personal choice in hours worked and breaks but none in the order of work or how a task is performed
- \_\_\_\_ Some choice in how work is done and the way tasks are performed
- \_\_\_\_ A lot of choice

I.D. Number \_\_\_\_\_

PART I  
Page Three

How much skill does it take to do your job?

- ☐ None  
☐ Some, mostly manual labor  
☐ Some, mostly "Using my head"  
☐ A lot

Do you supervise or train anybody?

- ☐ None  
☐ Some people  
☐ A lot of people

Can you contribute in any way to the decision making process at your job? For example, can you suggest different ways to achieve a goal and help organize work priorities?

- ☐ No  
☐ Sometimes, in my department  
☐ Sometimes, in the entire company  
☐ A lot of the time

## Activity Level

Does your work or daily activity require a lot of...?

(X only one)

- ☐ Sitting  
☐ Standing  
☐ Walking or other active exercise  
☐ Heavy labor (such as: lifting heavy objects)

In addition to your normal work or daily activity, how often do you do vigorous exercise, lasting 20 minutes or more, which noticeably increases your breathing (such as: walking, cycling, running, swimming, dancing)?

- ☐ Seldom  
☐ Less than once a week  
☐ Three times a week  
☐ Five or more days a week

## Smoking

Do you smoke...? ☐ No☐ Cigarettes

If yes, how many?

- ☐ less than  $\frac{1}{2}$  pack  
☐  $\frac{1}{2}$ -1 pack  
☐ 1-2 packs  
☐ 2 or more packs

☐ Cigar☐ Pipe

## Medical History

Do you take any medication? ☐ yes ☐ no

Please specify, if yes. \_\_\_\_\_



I.D. Number \_\_\_\_\_

PART I  
Page FourHas a doctor ever told you or a family member (parent, child)  
that you/they have:

<u>Yes</u>	<u>No</u>	<u>You</u>
_____	_____	Cancer
_____	_____	Diabetes
_____	_____	Heart Disease
_____	_____	High Blood Pressure
_____	_____	Stroke

		<u>Parent</u>
_____	_____	Cancer
_____	_____	Diabetes
_____	_____	Heart Disease
_____	_____	High Blood Pressure
_____	_____	Stroke

\_\_\_\_\_ Don't know/am adopted

		<u>Child</u>
_____	_____	Cancer
_____	_____	Diabetes
_____	_____	Heart Disease
_____	_____	High Blood Pressure
_____	_____	Stroke

\_\_\_\_\_ Don't know/have no children

CONTINUED ON NEXT PAGE

I.D. Number \_\_\_\_\_

PART II  
Page FiveGREEK CULTURE QUESTIONNAIRE

Directions: Please X the space which best describes your opinion about each statement.

1=Strongly Agree  
2=Agree  
3=Mildly Agree  
4=Mildly Disagree  
5=Disagree  
6=Strongly Disagree

	1	2	3	4	5	6
1. The public schools should teach more about the contributions of Greek people to America.						
2. I feel more comfortable in a Greek church.						
3. We don't need stronger organizations to express the view of Greek-Americans.						
4. A Greek neighborhood is a friendlier place to live.						
5. Organizations which carry on the Greek culture are important.						
6. Greek religious education is not important for our children.						
7. Greek music makes me want to dance.						
8. Our people should get their families to the Greek church on Sundays.						
9. A feeling for the Greek people is "in the blood."						
10. Tarpon Springs does not need a Greek newspaper.						
11. You should belong to the Greek church even if it is far from your home.						
12. It is not all right to change your name.						
13. I feel more comfortable with Greek people.						

I.D. Number \_\_\_\_\_

PART II  
Page Six

1=Strongly Agree  
 2=Agree  
 3=Mildly Agree  
 4=Mildly Disagree  
 5=Disagree  
 6=Strongly Disagree

	1	2	3	4	5	6
14. We don't need centers where our young people can learn about the Greek culture.						
15. The Greek religious tradition helps to strengthen my family life.						
16. We don't need to know the history of the Greek people.						
17. I would rather attend a Greek church at Christmas.						
18. Jokes about Greeks bother me.						
19. It is important for me to contribute my time, talent, and finances to the Greek church.						
20. If you're in trouble, you cannot count on Greek people to help you.						
21. We should be willing to give money to preserve the Greek tradition.						
22. It is better to marry someone of your own nationality.						
23. I should not encourage others to belong to the Greek church.						
24. Our children should learn Greek dances and music.						
25. I prefer a church where services are in the Greek language.						
26. The Greek tradition should be carried on by our young people.						

I.D. Number \_\_\_\_\_

PART II  
Page Seven

1=Strongly Agree  
 2=Agree  
 3=Mildly Agree  
 4=Mildly Disagree  
 5=Disagree  
 6=Strongly Disagree

	1	2	3	4	5	6
27. I would vote for a Greek political candidate rather than any other nationality regardless of political party.						
28. Our children should learn to speak Greek.						
29. I don't have an obligation to help new people in the Greek church get settled.						
30. You can be for your own people first and still be a good American.						

CONTINUED ON NEXT PAGE



I.D. Number \_\_\_\_\_

PART III  
Page EightEATING PREFERENCESDirections: Please X the space that best describes your eating preferences.Eating out: I choose to eat...

	NUMBER OF TIMES				
	Daily	Weekly	Monthly	Yearly	Almost Never
Where Greek food is served.					
In ethnic restaurants, such as: Italian, Mexican, Chinese.					
Where American foods are served, such as: steakhouse.					
At fast food restaurants, such as: drive-ins, salad bar, pizza restaurant or burger houses.					
At deli's and specialty dinners, such as: sub shons.					
From vending machines.					
In a coffee house.					

Eating at Home:

	NUMBER OF TIMES				
	Daily	Weekly	Monthly	Yearly	Almost Never
The household gathers for a common meal.					
Food served is prepared from basic ingredients.					
Foods served are a combination of convenience foods and basic ingredients.					
Most foods served are convenience foods.					
Food is prepared in a microwave oven.					
Foods are prepared "American style" or with American recipes.					
Foods are prepared "Greek style" or with Greek recipes.					
Ingredients common to Greece, such as: olive oil, feta cheese, are used in basic recipes.					
Groceries are purchased					
Please specify name of store where purchased _____					

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PART III  
Page NineEating at Home:

	NUMBER OF TIMES				
	Daily	Weekly	Monthly	Yearly	Almost Never
Food and drinks advertised on TV are purchased.					
Coupons for foods are clipped from the newspapers and used when shopping for groceries.					
Recipes are collected from magazines, such as: Ladies Home Journal, Redbook, Better Homes and Gardens, and used in meal preparation.					
Fasting foods are eaten in keeping with religious observances.					
Special holiday Greek foods are prepared and eaten in season.					

CONTINUED ON NEXT PAGE

I.D. Number \_\_\_\_\_

PART IV  
Page TenFOOD FREQUENCY QUESTIONNAIRE

Directions: Please X the space that best describes how often you eat the following foods.

	NUMBER OF TIMES				
	Daily	Weekly	Monthly	Yearly	Almost Never
Citrus fruits or juices, such as: orange, grapefruit, lemon					
Other fruits or juices, such as: apple, pear, banana					
Fruit punch or drink					
Cereal, such as: oatmeal, cornflakes, granola					
French toast, pancakes, waffles					
Feta Cheese					
Other cheese, such as: swiss, american, cheddar					
Margarine					
Butter					
Peanut butter					
Jam or jelly					
Syrup or honey					
Sugar					
White bread (include white muffins or bagels)					
Dark bread (include whole wheat, rye, etc.)					
Doughnuts, Danish, coffee cake					
Pita bread					
Fish (include eel, tuna, shrimp, oysters, etc.)					
Poultry, such as: chicken, turkey, duck, etc.					
Meat (hamburger, ham, pork, bacon, sausage, etc.)					
Taramosalata					
Eggs (include omelet)					

I.D. Number \_\_\_\_\_

PART IV  
Page Eleven

	NUMBER OF TIMES				Almost Never
	Daily	Weekly	Monthly	Yearly	
Potatoes (include hash browns, baked, mashed, fries)					
Rice					
Spaghetti, macaroni, or other pasta					
Vegetable salad (include tossed and coleslaw)					
Mayonnaise or salad dressing					
Olive oil					
Other vegetable oil, such as: corn, peanut, safflower					
Green Vegetables, such as: spinach, broccoli, beans					
Yellow or orange vegetables, such as: squash, tomatoes, carrots					
Lentils, chickpeas, dry beans, kidney beans					
Olives					
Greek peppers					
Ice cream					
Frozen yogurt					
Milkshakes, frostees					
Spinach-cheese pie (include Tiropita and Kreatopita)					
Potato chips, corn chips (include other salty snack foods)					
Greek pastries (include baklava, kataife, etc.)					
Other pastries, such as: cookies and cakes					
Hard candies					
Chocolate candies					
Cow's milk					
Low fat milk					
Skim milk					



I.D. Number \_\_\_\_\_

PART IV  
Page Twelve

	NUMBER OF TIMES				
	Daily	Weekly	Monthly	Yearly	Almost Never
Goat's milk					
Chocolate milk					
Yogurt					
Evaporated milk					
Condensed milk					
Whipped cream					
Non-Dairy whipped topping					
Coffee cream					
Non-Dairy creamer					
Regular coffee or tea					
Greek coffee					
Decaffeinated coffee or tea					
Herbal teas					
Hot chocolate					
Koolade or soft drinks					
Diet drinks or sodas					
Beer, wine, whiskey, ouzo					
Other, please specify					

CONTINUED ON NEXT PAGE





I.D. Number \_\_\_\_\_

PART V  
Page Fifteen

DID YOU HAVE LUNCH AND SUPPER YESTERDAY?

	<u>Yes</u>	<u>No</u>
Lunch	_____	_____
Supper	_____	_____

## LUNCH AND SUPPER YESTERDAY

FOOD/BEVERAGE	Lunch Servings							Supper Servings						
	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	
<u>Soups</u>														
Broth, such as:														
Vegetable, Chicken														
Noodle, etc.														
Creamy, such as:														
Cream of Mushroom,														
Cream of Chicken														
Egg-Lemon														
Other Soup														
<u>Sandwiches</u>														
Cheese (Grilled														
or Plain)														
Egg, Egg Salad														
Meat (Beef, Salami,														
Bologna)														
Fish (Tuna, Fried														
Fish, Tuna Salad														
Poultry (Chicken,														
Turkey, Chicken														
Salad)														
Hot Dog/Bun														
Submarine, Hoagie,														
Hero														
Hamburger/Bun														
Cheeseburger/Bun														
Whopper														
Wheeler														
McDLT														
Taco														
Burrito														
Other Sandwich														
<u>Main Dishes</u>														
Beef (Steak, Roast,														
Ribs, Hamburger/no														
Bun														
Lamb (Chop, Roast)														
Ham														
Poultry (Duck,														
Chicken, Turkey)														
Baked, roasted														



I.D. Number \_\_\_\_\_

PART V  
Page Sixteen

## LUNCH AND SUPPER YESTERDAY

FOOD/BEVERAGE	Lunch							Supper						
	Servings							Servings						
	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	
Main Dishes														
Fried Chicken														
Fish (include shellfish), baked, broiled, raw														
Fried Fish														
Potatoes														
Fried Potatoes or French Fries														
Baked Potatoes, Boiled or Mashed														
Pasta														
Spaghetti or Macaroni without Sauce														
Rice														
Pilaf														
Did you add...?														
Gravy														
Tomato Sauce														
Sour Cream														
Butter														
Margarine														
Mixtures														
Moussaka														
Souvlaki														
Pastitsio														
Lasagna, Ravioli, or Pasta Dinner														
Pizza														
Macaroni and Cheese														
Pork and Beans														
Other														
Salads														
Greek Salad														
Tossed Salad														
Potato or Macaroni Salad														
Other Salad														

I.D. Number \_\_\_\_\_

PART V  
Page Seventeen

## LUNCH AND SUPPER YESTERDAY

FOOD/BEVERAGE	Lunch							Supper						
	Servings							Servings						
	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	
Did you add anything to the salad?														
Mayonnaise														
Salad Dressing														
Diet Dressing														
Corn Oil														
Olive Oil														
Vinegar														
Other														
Vegetables														
Green: stringbeans, spinach, broccoli														
Yellow, orange, red: Carrots, beets, corn, tomatoes														
Other														
Bread or Rolls														
White														
Dark														
Did you add the following to the vegetables or bread...?														
Margarine														
Butter														
Olive Oil														
Lemon														
Beverages														
Whole Milk														
Low Fat Milk														
Skim Milk														
Chocolate Milk														
Milkshake or Frostee														
Coffee														
Decaf Coffee or Tea														
Tea (Iced or Hot)														
Did you add...?														
Cream														
Non-Dairy Creamer														
Sugar														
Sugar Substitute														
Greek Coffee														
Koolade or Fruit Drink														

I.D. Number \_\_\_\_\_

PART V  
Page Eighteen

## LUNCH AND SUPPER YESTERDAY

FOOD/BEVERAGE	Lunch							Supper						
	Servings							Servings						
	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	
<u>Beverages</u>														
Soft Drink, such as: Coke, Pepsi														
Diet Soft Drink														
Beer														
Wine														
Whiskey, Gin, Rum														
Ouzo														
Other Beverage														
<u>Desserts</u>														
Fresh Fruit														
Canned Fruit														
Cake, Cupcake														
Pie, Turnover														
Ice cream														
Pudding														
Sherbet														
Jello														
Cookies														
Greek Pastry														
Other Dessert														

CONTINUED ON NEXT PAGE

I.D. Number

PART V  
Page Nineteen

DID YOU HAVE AN AFTERNOON OR EVENING SNACK YESTERDAY?

Yes No

	<u>Yes</u>	<u>No</u>
Afternoon Snack		

Evening Snack

AFTERNOON AND EVENING SNACK YESTERDAY

[illegible]



I.D. Number \_\_\_\_\_

PART V  
Page Twenty

## AFTERNOON AND EVENING SNACK YESTERDAY

FOOD/BEVERAGE	Afternoon Snack							Evening Snack						
	Servings							Servings						
	$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3		$\frac{1}{2}$	1	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	
If you had a beverage, did you add...?														
Cream														
Non-Dairy Creamer														
Sugar														
Sugar Substitute														
Beer														
Wine														
Whiskey, Gin, Rum														
Ouzo														
Other Snack														

Yes   No  
 \_\_\_\_\_ Did you eat about the same amount of food yesterday as you eat most days?  
 If you ate differently, was it more \_\_\_\_\_ or less \_\_\_\_\_ than you usually eat? Please explain why. \_\_\_\_\_

\_\_\_\_\_ Are you on a special diet?  
 If yes, what kind? \_\_\_\_\_  
 Who prescribed it? \_\_\_\_\_  
 Do you take a daily vitamin supplement?  
 If yes, please give the name(s). \_\_\_\_\_

\_\_\_\_\_

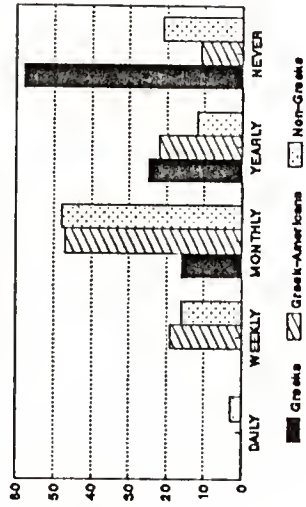
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APPENDIX C

EATING PREFERENCES OF ETHNIC GROUPS

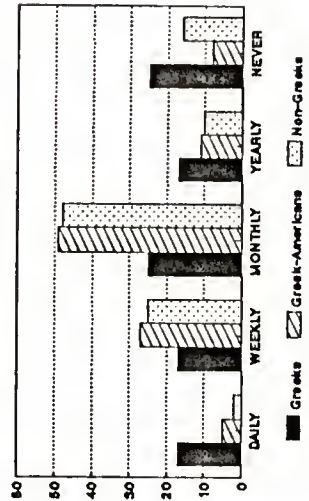
# Appendix C

## EAT OUT PREFERENCES ETHNIC RESTAURANT



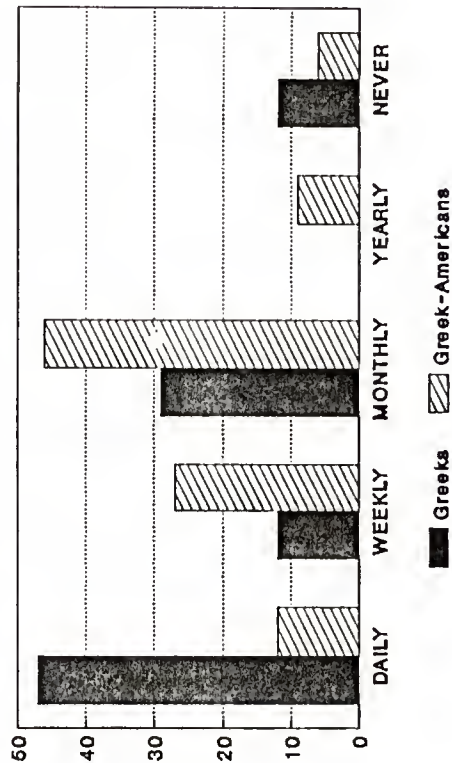
C-1

## EAT OUT PREFERENCES AMERICAN RESTAURANT



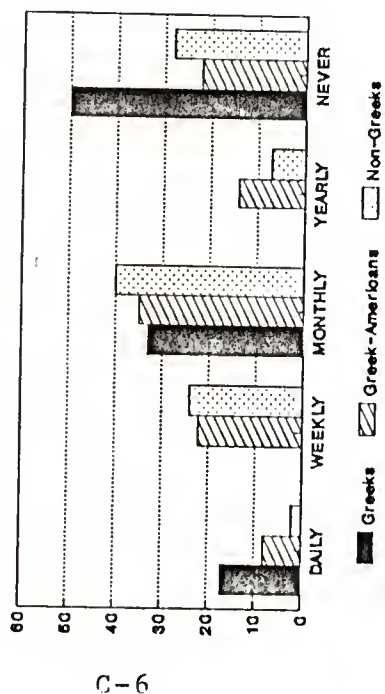
C-2

## EAT OUT PREFERENCES GREEK RESTAURANT



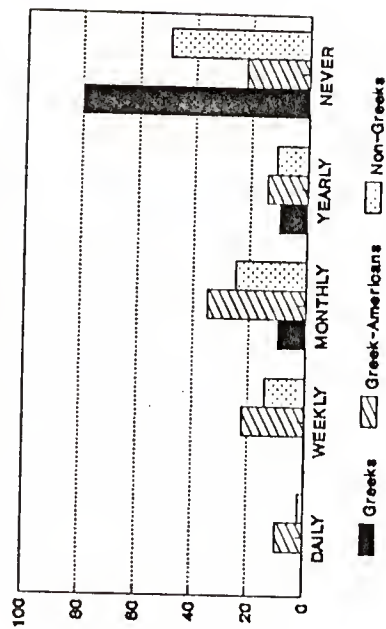
C-3

# EAT OUT PREFERENCES FAST FOOD RESTAURANT



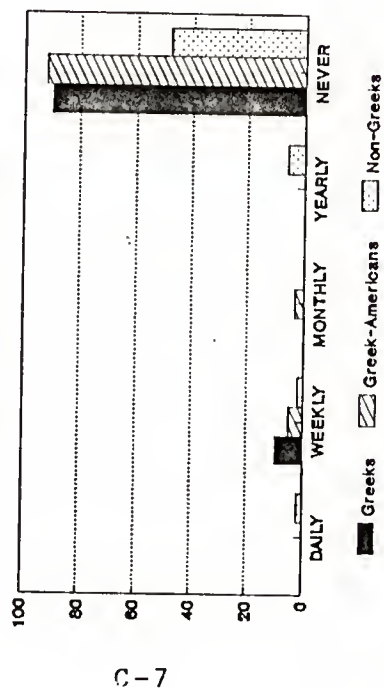
C-6

# EAT OUT PREFERENCES DELI OR SUB SHOP



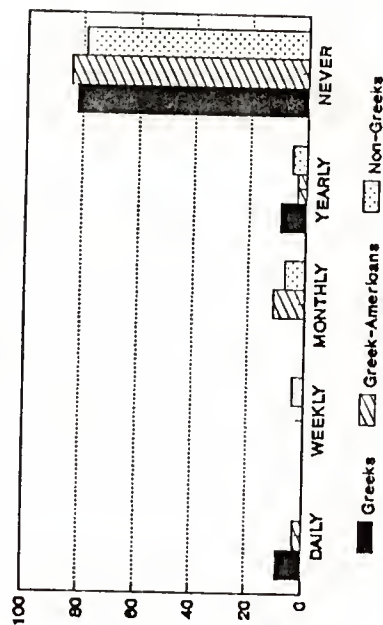
C-4

# EAT OUT PREFERENCES VENDING MACHINE



C-7

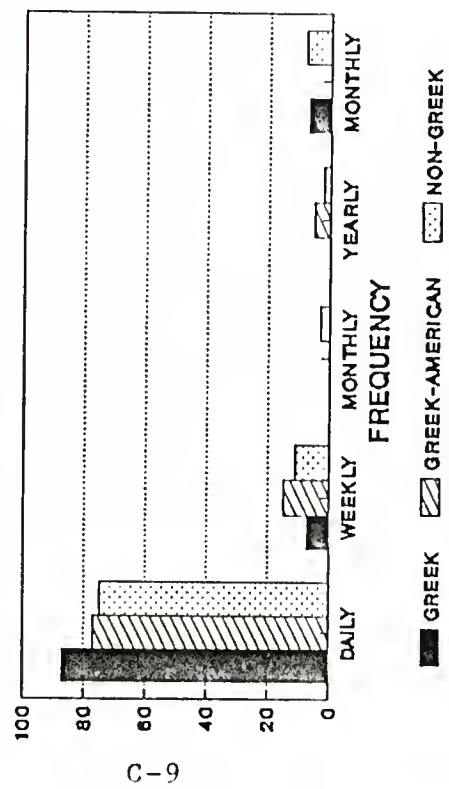
# EAT OUT PREFERENCES COFFEE HOUSE



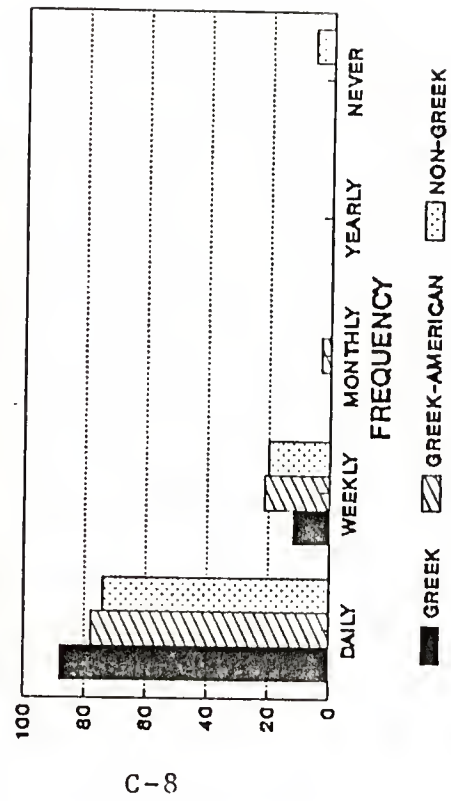
C-5



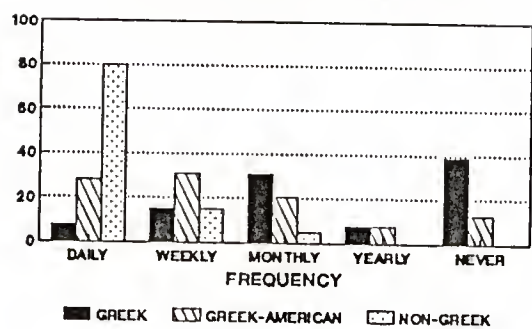
# EAT-IN PREFERENCE COMMON MEAL



# EAT-IN PREFERENCE USE BASIC INGREDIENTS

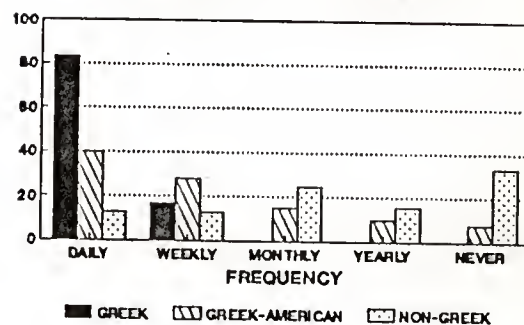


### EAT-IN PREFERENCE "AMERICAN STYLE" RECIPES



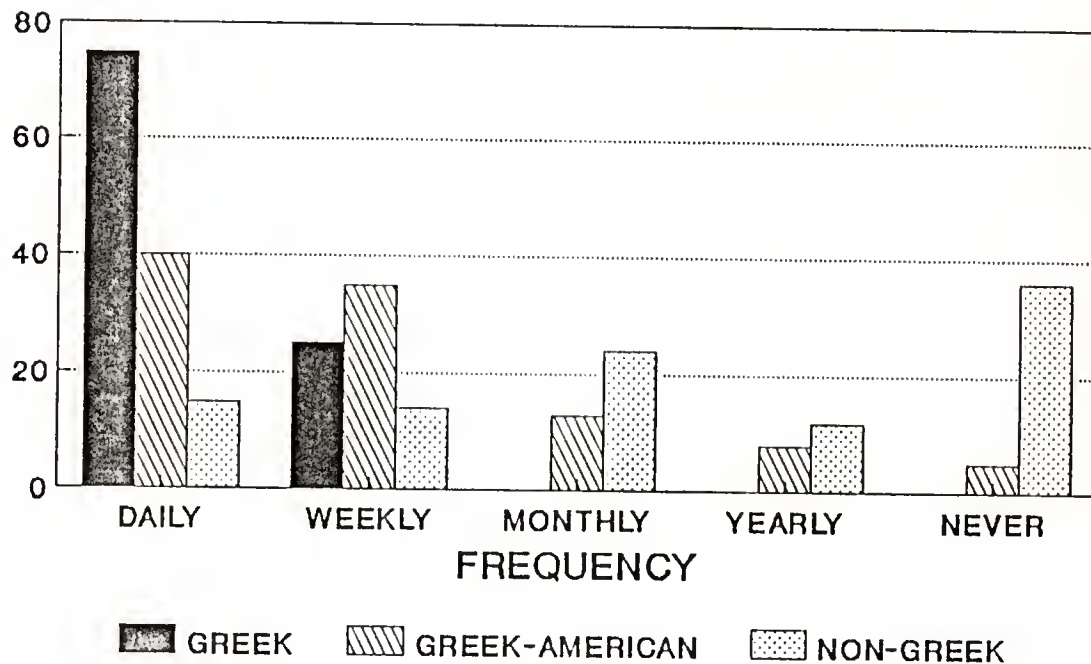
C-10

### EAT-IN PREFERENCE "GREEK STYLE" RECIPES



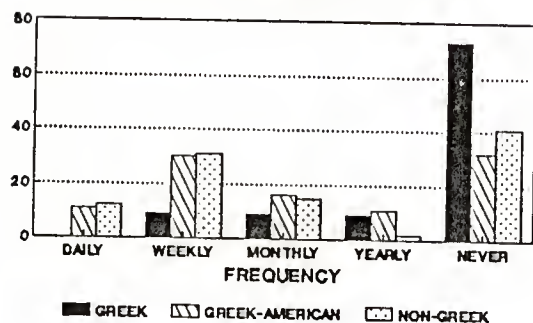
C-11

## EAT-IN PREFERENCE USE GREEK INGREDIENTS



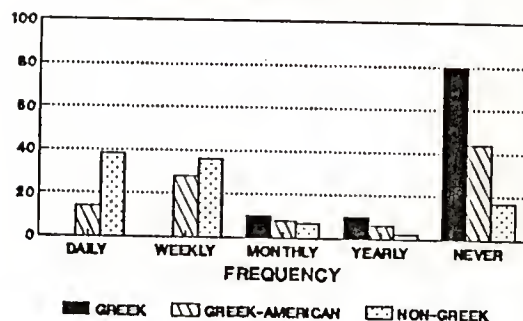
C-12

### EAT-IN PREFERENCE USE CONVENIENCE FOODS



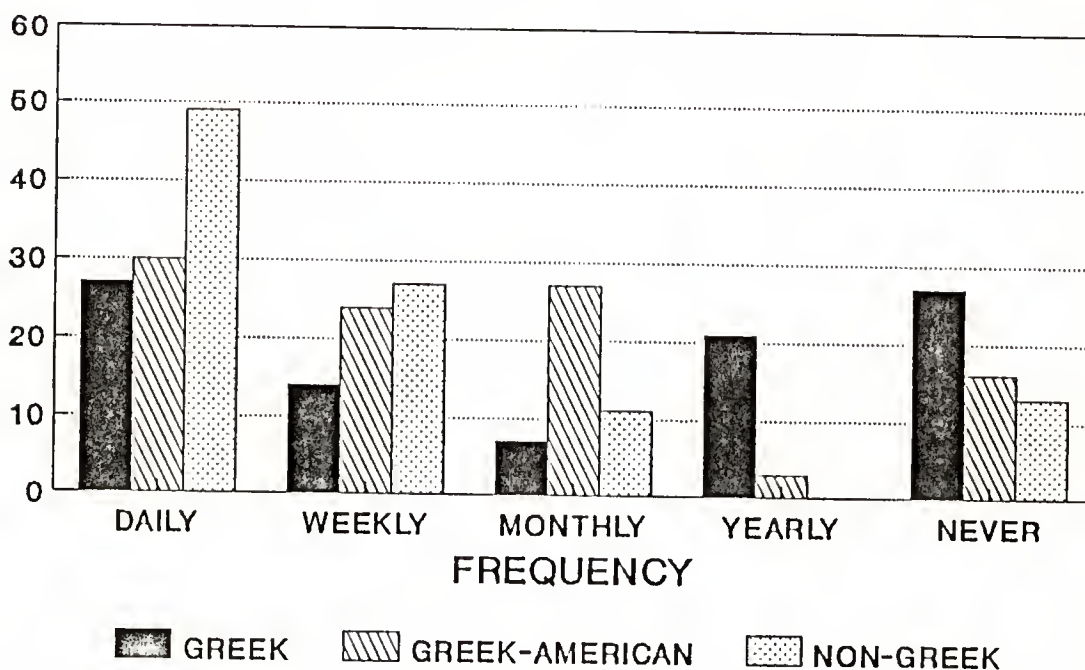
C-13

### EAT-IN PREFERENCE USE MICROWAVE OVEN



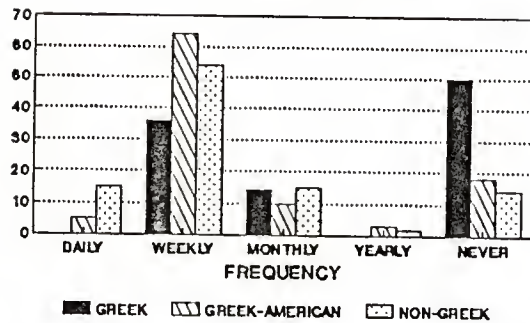
C-14

## EAT-IN PREFERENCE COMBINATION BASIC AND CONVENIENCE



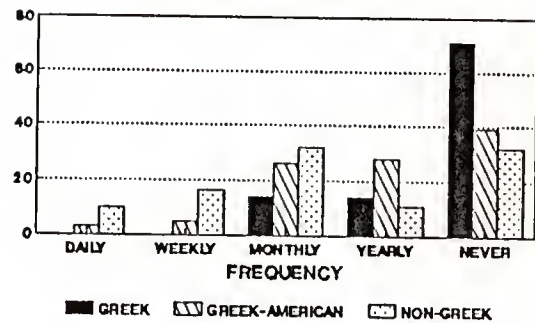
C-15

### EAT-IN PREFERENCE COUPON USE



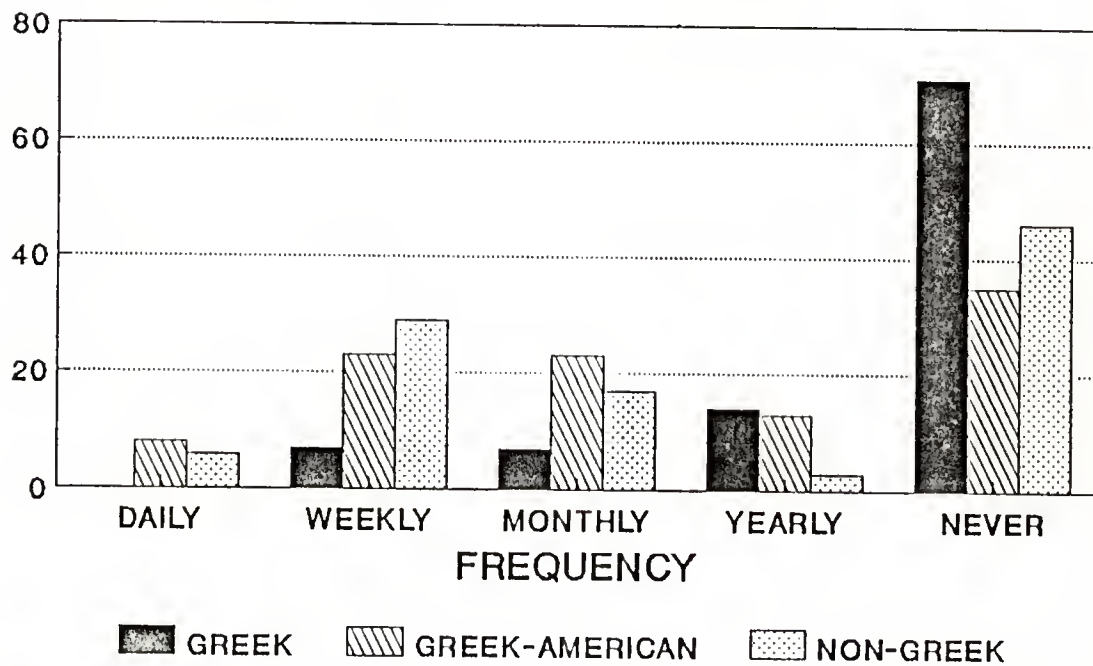
C-16

### EAT-IN PREFERENCE MAGAZINE RECIPES



C-17

## EAT-IN PREFERENCE TV AD PURCHASES

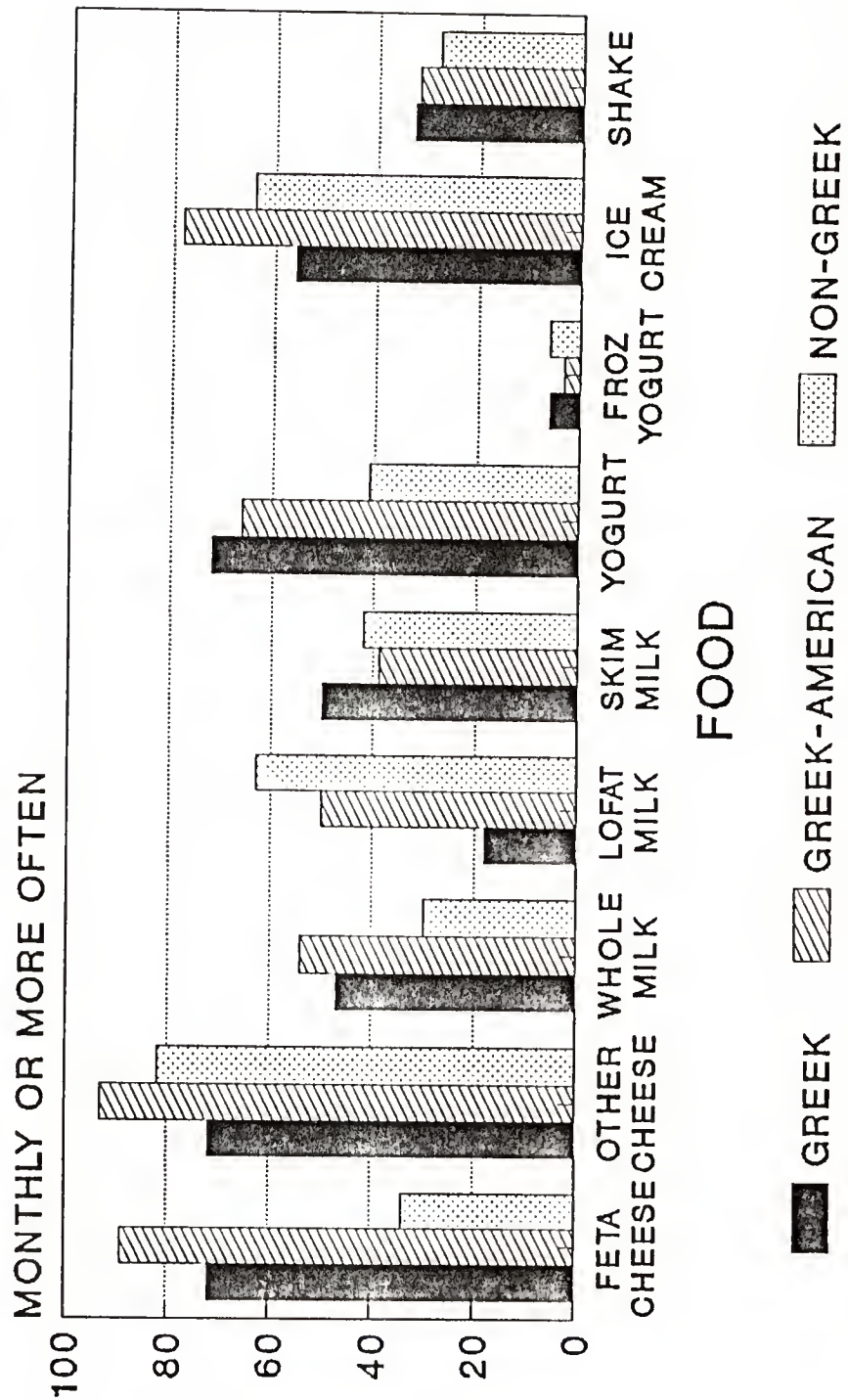


C-18



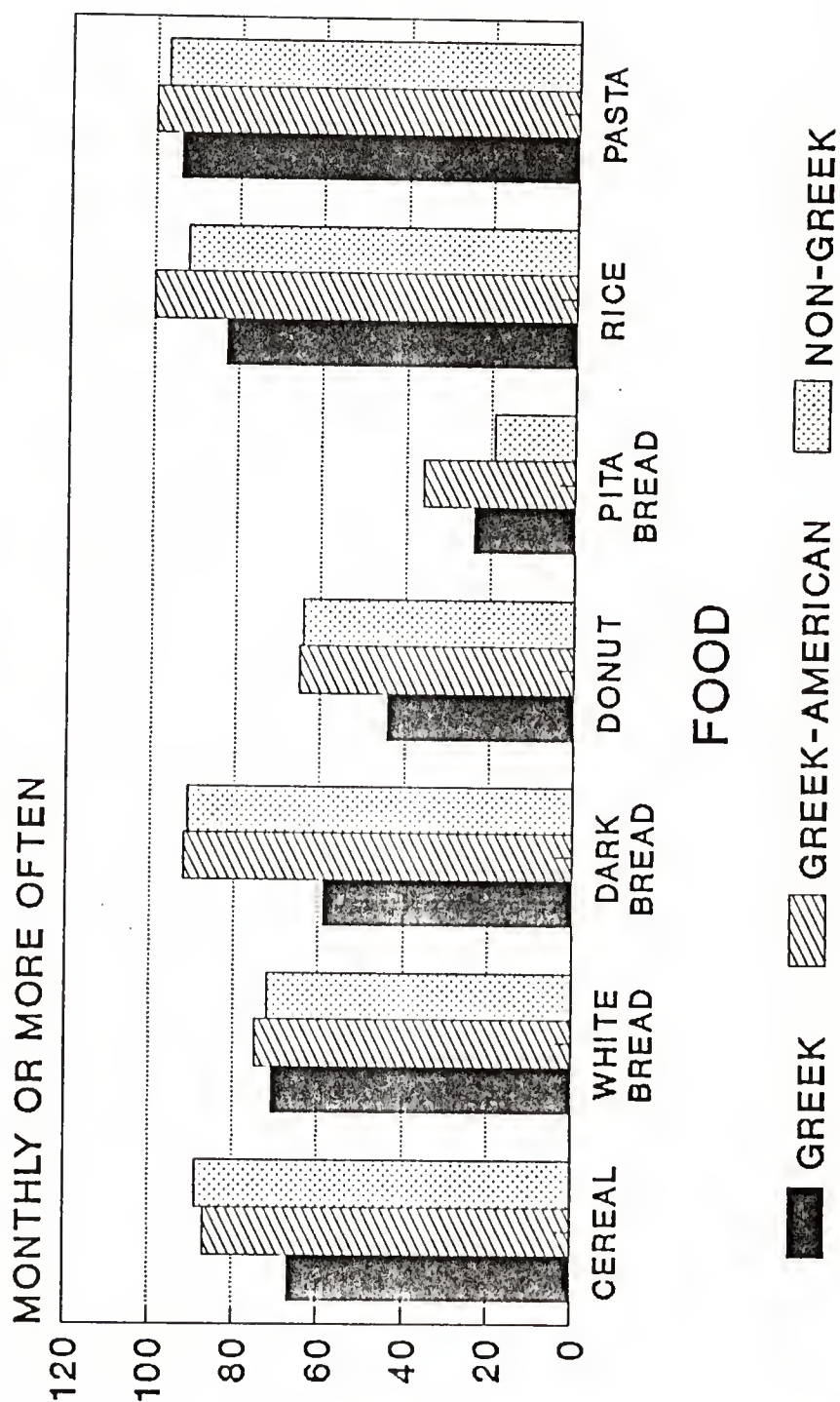
APPENDIX D  
FOOD FREQUENCIES

# DAIRY REPORTED FREQUENCY OF INTAKE



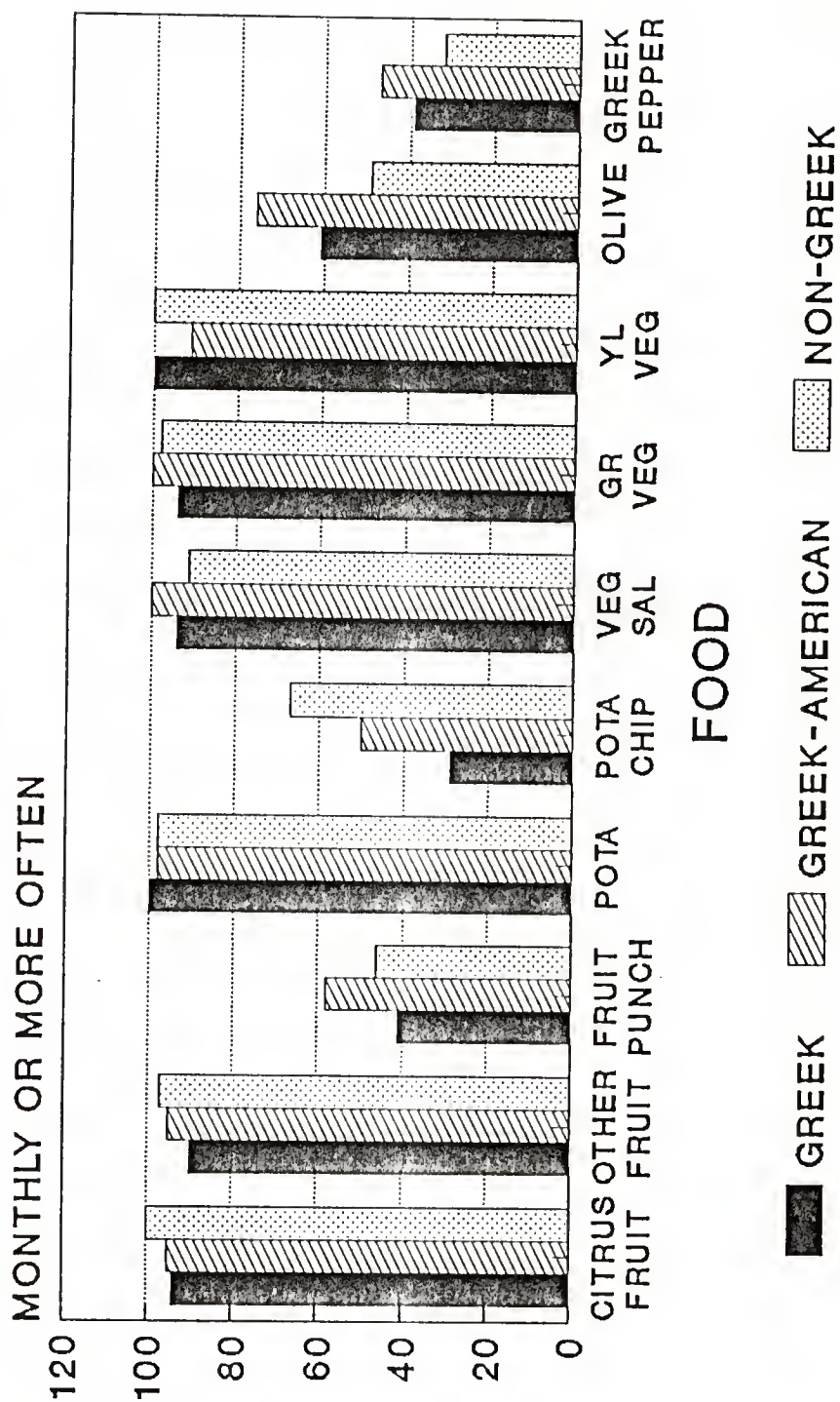
D-1

# GRAINS REPORTED FREQUENCY OF INTAKE



D-2

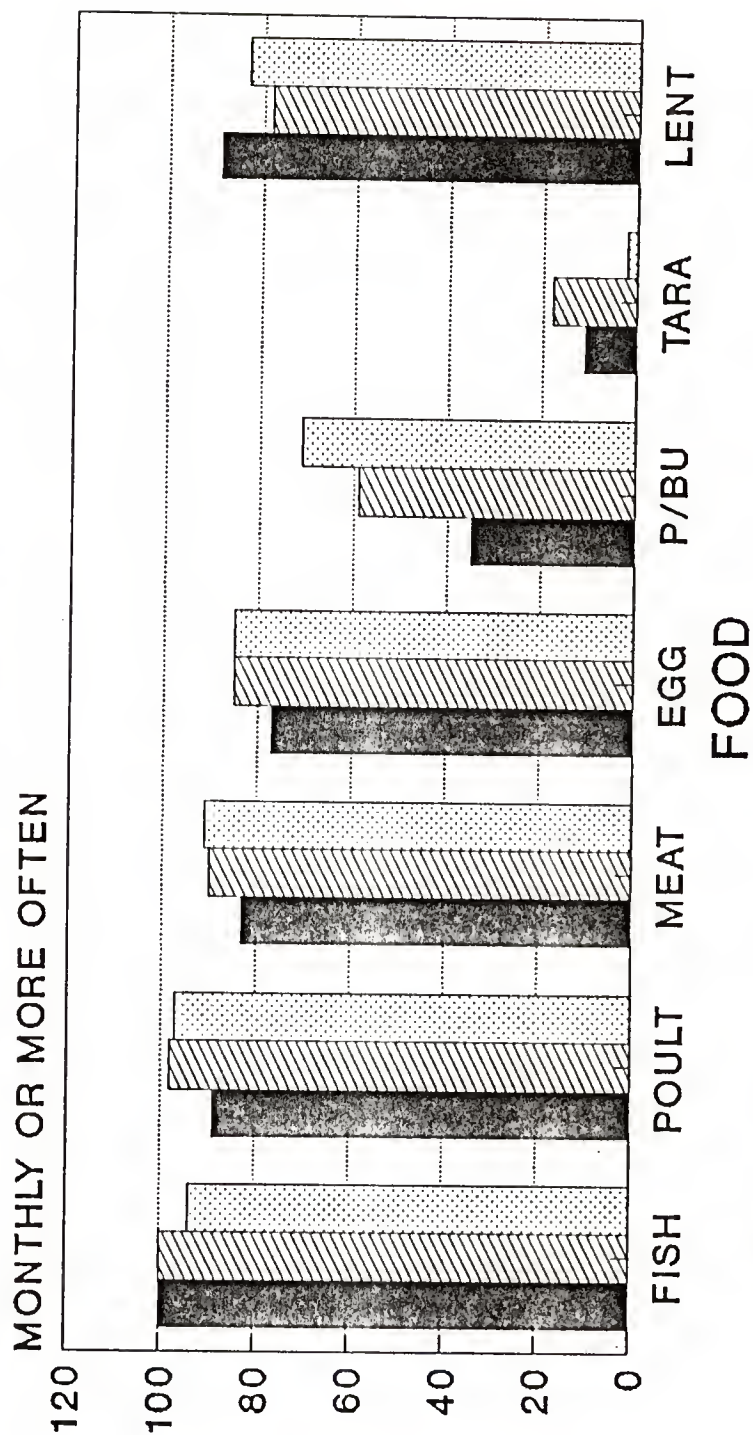
# FRUITS AND VEGETABLES REPORTED FREQUENCY OF INTAKE



D-3



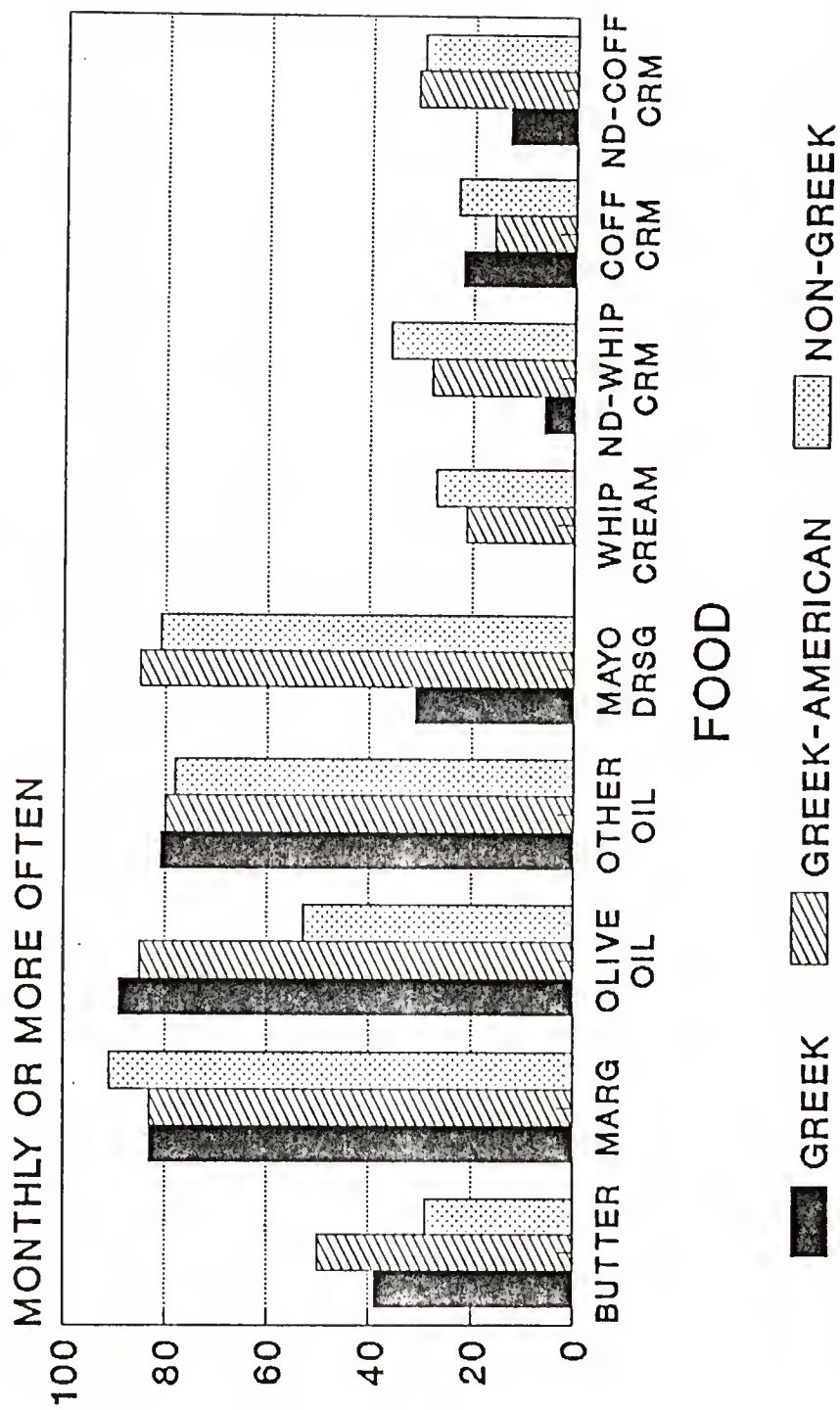
# PROTEIN FOODS REPORTED FREQUENCY OF INTAKE



D-4

# FATS

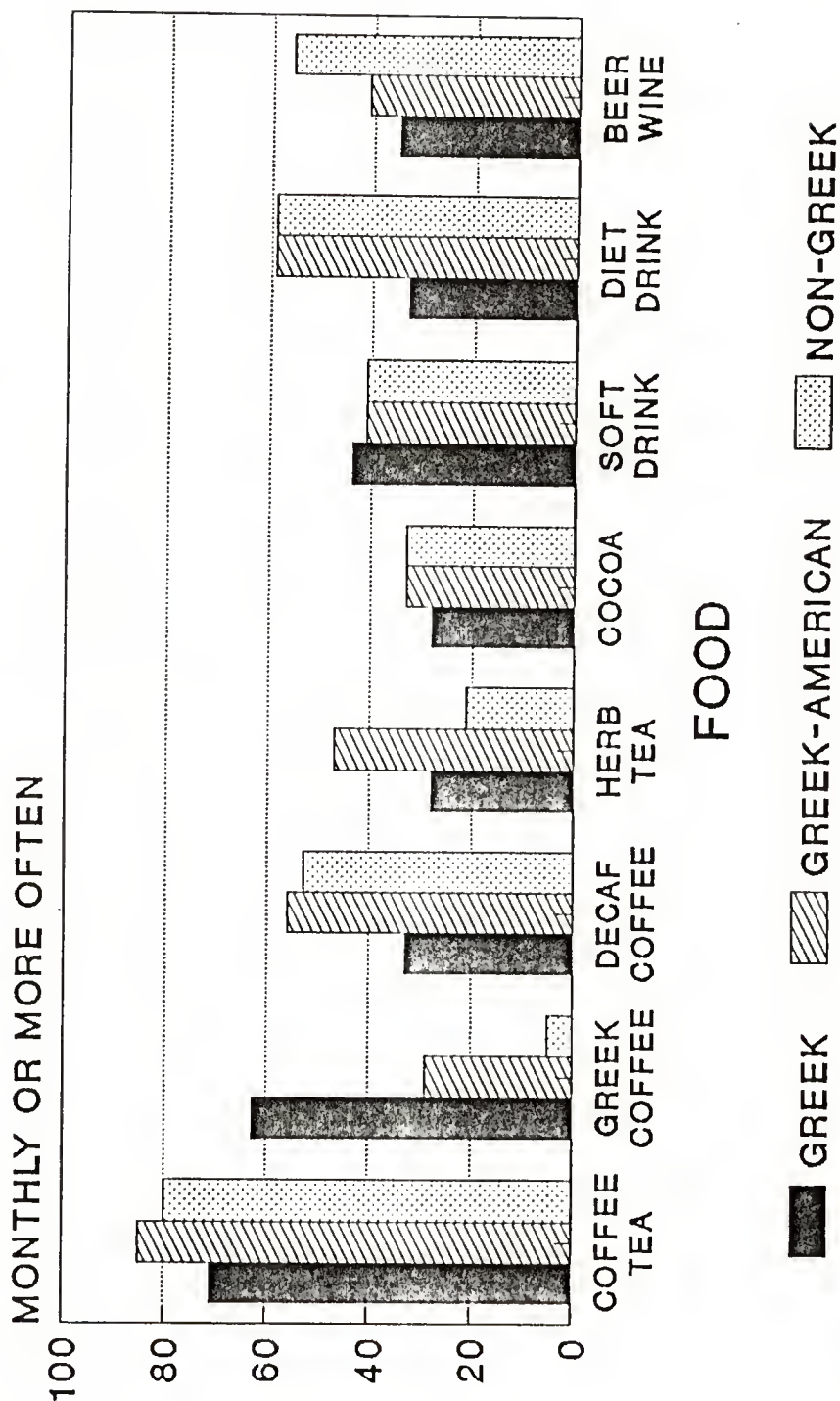
## REPORTED FREQUENCY OF INTAKE



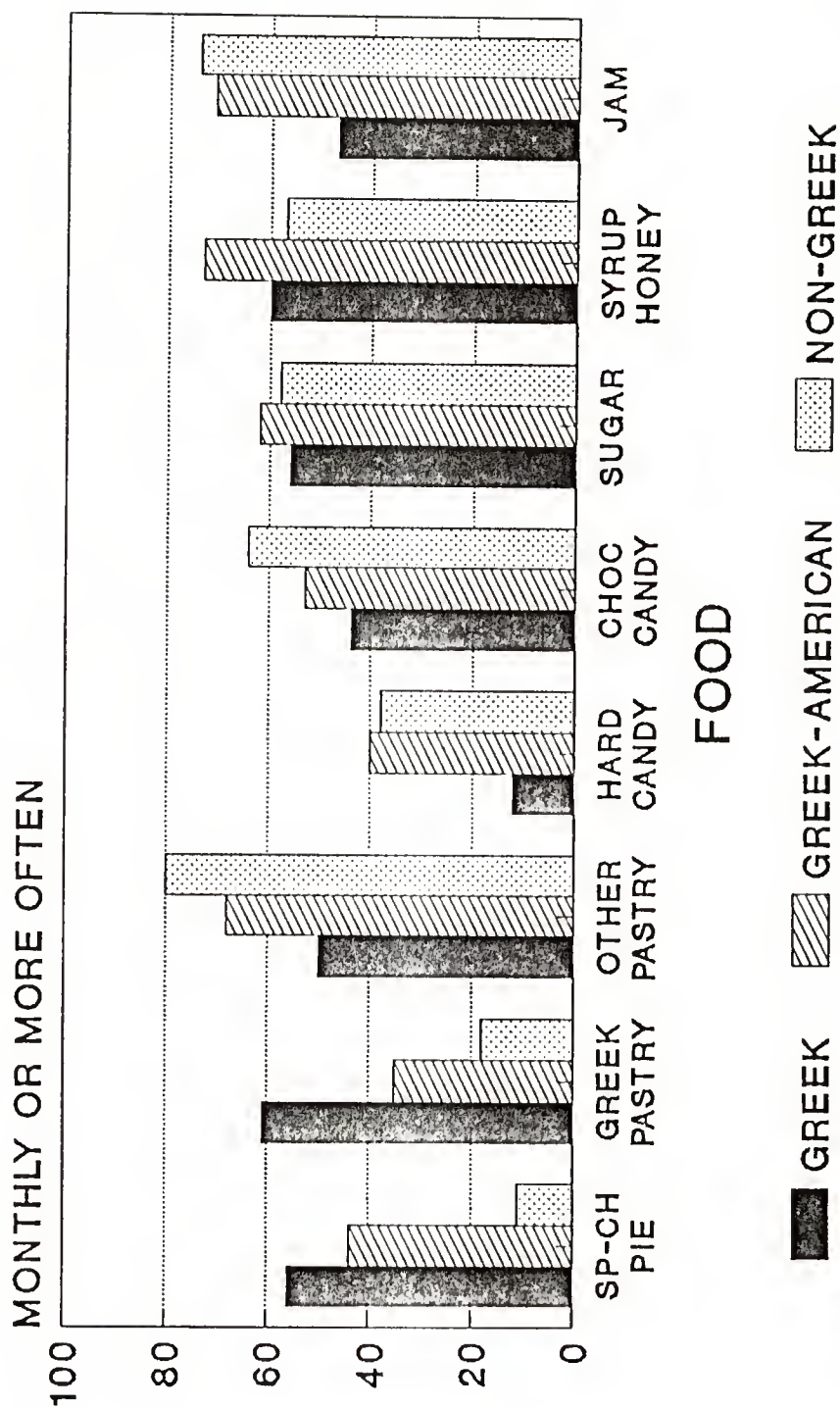
D-5

# BEVERAGES

## REPORTED FREQUENCY OF INTAKE



# PASTRIES AND SWEETS REPORTED FREQUENCY OF INTAKE



D-7



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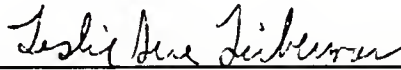
## BIOGRAPHICAL SKETCH

My M.S. degree was awarded from Indiana University (IUPUI, Indianapolis campus) in allied health education (nutrition), August 1974 and my B.S. degree was awarded by Eastern Mennonite College in home economics (nutrition), June 1964. Upon completion of my dietetic internship at the LDS Hospital, Salt Lake City, Utah, I worked as a pediatric dietitian at the University of Iowa Hospital and Clinics, Iowa City, Iowa. Other positions included: Acting Nutrition Division Director and Adjunct Instructor, Nutrition Division, Mailman Center for Child Development, Department of Pediatrics, University of Miami School of Medicine; Nutrition Consultant for MRFIT, Dade County Health Department; Adjunct Instructor, Department of Nutrition and Dietetics, Florida International University; Research Instructor and Assistant Professor, Nutrition Division, Department of Epidemiology and Public Health, University of Miami School of Medicine; Visiting Assistant Professor, Clinical and Community Dietetics, University of Florida; Graduate Research Assistant, Department of Health Science, College of Health and Human Performance, and Clinical and Community Dietetics, College of Health Related Professions,

University of Florida; and Nutritionist, Alachua General Hospital Center for Health and Fitness. I was awarded the Lydia J. Roberts Fellowship in Public Health Nutrition from the American Dietetic Association during the 1987-1988 school year.

My research interests grew from my participation in an NHLBI-funded grant that was awarded to George Christakis, M.D., M.P.H., Director, Nutrition Division, Department of Epidemiology and Public Health, University of Miami School of Medicine. The study examined the evolution of risk factors for coronary heart disease (CHD) among adolescent boys in a low-risk country (Greece) and a high-risk country (USA). The findings suggested that those Greek immigrants to the U.S. who "Americanized" their diets were increasing their CHD risk, as observed by their increased total and LDL serum cholesterol and triglyceride levels.

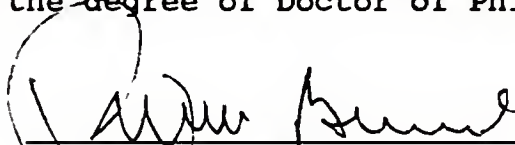
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Professor of Anthropology

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